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Brecksville, OH (2 locations)

Research and development, prototyping and light manufacturing facility

San Francisco, CA

Research and development

Richardson, TX

Research and development

Agoura Hills, CA

Research and development

1

Bangalore, India

Administrative offices, research and development and service functions

1

Tokyo, Japan

Business development

1

Seoul, Korea

Business development

1

Shanghai, China

Business development

1

Singapore

Business development

1

Taipei, Taiwan

Business development

1

Melbourne, Australia

Business development

1

Rotterdam, The Netherlands

Administrative offices, research and development, sales and marketing and service functions

1

East Kilbride, United Kingdom

Administrative offices, research and development, sales and marketing and service functions

1

Toronto, Canada

Research and development

1

Espoo, Finland

Research and development

Item 3. Legal Proceedings

We are not currently a party to any material pending legal proceeding; however, from time to time, we may become involved in legal proceedings or be subject to claims arising in the ordinary course of our business. Although the results of litigation and claims cannot be predicted with certainty, we currently believe that the final outcome of these ordinary course matters will not have a material adverse effect on our business, operating results, financial position or cash flows. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management attention and resources and other factors.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

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

Our Common Stock is listed on The NASDAQ Global Select Market under the symbol "RMBS." The following table sets forth for the periods indicated the high and low sales price per share of our common stock as reported on The NASDAQ Global Select Market.

	Year Ended		Year Ended	
	December 31,		December 31,	
	2018		2017	
	High	Low	High	Low
First Quarter	\$14.63	\$11.85	\$14.24	\$12.37
Second Quarter	\$14.30	\$12.54	\$13.41	\$11.39
Third Quarter	\$13.61	\$10.76	\$13.64	\$11.30
Fourth Quarter	\$10.99	\$7.17	\$15.50	\$13.32

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The graph below compares the cumulative 5-year total return of holders of Rambus Inc.'s common stock with the cumulative total returns of the NASDAQ Composite index and the RDG Semiconductor Composite index. The graph tracks the performance of a \$100 investment in our common stock and in each index (with the reinvestment of all dividends) from December 31, 2013 to December 31, 2018.

Fiscal years ending:

	12/13	12/14	12/15	12/16	12/17	12/18
Rambus Inc.	100.00	117.11	122.39	145.41	150.16	80.99
NASDAQ Composite	100.00	114.62	122.81	133.19	172.11	165.84
RDG Semiconductor Composite	100.00	128.26	118.01	157.41	216.98	197.02

The stock price performance included in this graph is not necessarily indicative of future stock price performance. Information regarding our securities authorized for issuance under equity compensation plans will be included in Item 12, "Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters," of this report on Form 10-K.

As of January 31, 2019, there were 463 holders of record of our common stock. Since many of the shares of our common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of beneficial stockholders represented by these record holders.

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We have never paid or declared any cash dividends on our common stock or other securities.

Share Repurchase Program

On January 21, 2015, our Board approved a share repurchase program authorizing the repurchase of up to an aggregate of 20.0 million shares. Share repurchases under the plan may be made through the open market, established plans or privately negotiated transactions in accordance with all applicable securities laws, rules, and regulations. There is no expiration date applicable to the plan. As part of the broader share repurchase program previously authorized by our Board on January 21, 2015, we initiated an accelerated share repurchase program with Citibank, N.A. on March 5, 2018 which was completed in the second quarter of 2018. After giving effect to such accelerated share repurchase program, detailed in the table below, we had remaining authorization to repurchase approximately 3.6 million shares.

We record stock repurchases as a reduction to stockholders' equity. We record a portion of the purchase price of the repurchased shares as an increase to accumulated deficit when the price of the shares repurchased exceeds the average original proceeds per share received from the issuance of common stock.

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Number of Shares that May Yet be Purchased Under the Plans or Programs
Cumulative shares repurchased as of December 31, 2017	12,565,372	\$11.94	12,565,372	7,434,628
January 1, 2018 - March 31, 2018 (1)	3,117,693	\$13.21	3,117,693	4,316,935
April 1, 2018 - June 30, 2018 (1)	667,653	\$13.21	667,653	3,649,282
Cumulative shares repurchased as of December 31, 2018	16,350,718		16,350,718	

(1) In the first quarter of 2018, we entered into an accelerated share repurchase program with Citibank, N.A. to repurchase an aggregate of \$50.0 million of our common stock. We made an upfront payment of \$50.0 million pursuant to the accelerated share repurchase program and received an initial delivery of 3.1 million shares which were retired and recorded as a \$40.0 million reduction to stockholders' equity. The remaining \$10.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to our stock. During the second quarter of 2018, the accelerated share repurchase program was completed and we received an additional 0.7 million shares of our common stock, which were retired, as the final settlement of the accelerated share repurchase program. The total shares of our common stock received and retired under the terms of the accelerated share repurchase program were 3.8 million, with an average price paid per share of \$13.21. See Note 13, "Stockholders' Equity," of Notes to Consolidated Financial Statements of this Form 10-K for further discussion.

Item 6. Selected Financial Data

The following selected consolidated financial data as of and for the years ended December 31, 2018, 2017, 2016, 2015 and 2014 was derived from our consolidated financial statements. The following selected consolidated financial data should be read in conjunction with Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," and Item 8, "Financial Statements and Supplementary Data," and other financial data included elsewhere in this report. Our historical results of operations are not necessarily indicative of results of operations to be expected for any future period.

	Years Ended December 31,				
	2018 (3) (4) (5)	2017 (3) (4)	2016 (1) (2)	2015 (2) (3) (4)	2014 (2)
	(In thousands, except per share amounts)				
Total revenue	\$231,201	\$393,096	\$336,597	\$296,278	\$296,558
Net income (loss)	\$(157,957)	\$(22,862)	\$6,820	\$211,388	\$26,201
Net income (loss) per share:					
Basic	\$(1.46)	\$(0.21)	\$0.06	\$1.84	\$0.23
Diluted	\$(1.46)	\$(0.21)	\$0.06	\$1.80	\$0.22
Consolidated Balance Sheet Data:					
Cash, cash equivalents and marketable securities	\$277,764	\$329,376	\$172,182	\$287,706	\$300,109
Total assets	\$1,361,155	\$891,072	\$783,496	\$718,021	\$586,235
Convertible notes	\$141,934	\$213,898	\$126,167	\$119,418	\$113,045
Stockholders' equity	\$1,012,112	\$571,584	\$552,782	\$526,533	\$391,622

The net income for the year ended December 31, 2016 included \$18.3 million of impairment of in-process research (1) and development intangible asset and a reduction of operating expenses due to the change in our contingent consideration liability of \$6.8 million.

The net income (loss) for the years ended December 31, 2016, 2015 and 2014 included \$0.6 million, \$2.0 million (2) and \$2.0 million, respectively, of gain from settlement which was reflected as a reduction of operating costs and expenses.

The net loss for the year ended December 31, 2018 included a \$113.7 million impact of an increase in our deferred tax asset valuation allowance. The net loss for the year ended December 31, 2017 included a \$21.5 million impact (3) due to the recording of a deferred tax asset valuation allowance and \$20.7 million related to re-measurement of deferred tax assets as a result of the tax law changes. The net income for the year ended December 31, 2015 included \$174.5 million related to the reversal of the deferred tax asset valuation allowance.

Stockholders' equity includes \$50.0 million paid under the accelerated share repurchase program initiated in both (4) March 2018 and May 2017, and \$100.0 million paid under the accelerated share repurchase program initiated in October 2015 as well as the \$174.5 million net impact of the reversal of the deferred tax asset valuation allowance. (5) Reflects the impact from the adoption of ASC 606. See Note 3, "Recent Accounting Pronouncements," of Notes to Consolidated Financial Statements of this Form 10-K for further discussion.

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

This report 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 as described in more detail under "Note Regarding Forward-Looking Statements." Our forward-looking statements are based on current expectations, forecasts and assumptions and are subject to risks, uncertainties and changes in condition, significance, value and effect. As a result of the factors described herein, and in the documents incorporated herein by reference, including, in particular, those factors described under "Risk Factors," we undertake no obligation to publicly disclose any revisions to these forward-looking statements to reflect events or circumstances occurring subsequent to filing this report with the Securities and Exchange Commission.

The following discussion and analysis should be read in conjunction with the consolidated financial statements and related notes that are included elsewhere in this report.

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

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Executive Summary

We create innovative hardware, software and services that drive technology advancements from the data center to the mobile edge. Our architecture licenses, IP cores, chips, software and services span memory and interfaces, security and emerging 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 Big Data, Internet of Things (IoT) security, mobile payments and smart ticketing.

Highlights from our annual results were as follows:

Revenue of \$231.2 million;

Operating Costs and Expenses of \$318.2 million

GAAP diluted net loss per share of \$1.46;

Net cash provided by operating activities of \$87.1 million

In 2018, we had record product revenue for IP cores and server DIMM chips with wins at Tier 1 customers in the data center and communications segments worldwide. Additionally, our CryptoManager platform was selected to securely provision the Authentia™ based secure memory at Micron.

Business Overview

Dedicated to making data faster and safer, Rambus creates innovative hardware, software and services that drive technology advancements from the data center to the mobile edge. Our architecture licenses, IP cores, chips, software, and services span memory and interfaces, security, and emerging 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 Big Data, Internet of Things (IoT) security, mobile payments, and smart ticketing.

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, mobile payments and smart ticketing. We intend to continue our growth into new technology fields, 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.

Our strategy is to continue to augment our patent license business model to provide additional technology, products and services while creating and leveraging strategic synergies to increase revenue. In support of our strategy, Rambus has transitioned to focus on two key high-growth markets - the data center and the mobile edge - with an approach and product roadmap that leverage our core competencies and supplement with ingredient components to both differentiate and accelerate our position in complementary markets.

Organization

We have organized the business into three operational units: (1) Memory and Interfaces, or MID, which focuses on the design, development, manufacturing through partnerships and licensing of technology and solutions that is related to memory and interfaces; (2) Rambus Security, or RSD, which focuses on the design, development, deployment and licensing of technologies for chip, system and in-field application security, anti-counterfeiting, smart ticketing and mobile payments; and (3) Emerging Solutions, or ESD, which includes the Rambus Labs team and the development efforts in the area of emerging technologies.

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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.

As of December 31, 2018, MID and RSD met quantitative thresholds for disclosure as reportable segments. Results for the remaining operating segments were 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.

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Revenue Sources

On January 1, 2018, we adopted ASU No. 2014-09, Revenue from Contracts with Customers in Accounting Standards Codification (ASC) Topic 606 (“ASC 606”, “the New Revenue Standard”) and all the related amendments using the modified retrospective method. We recognized the cumulative effect of initially applying the New Revenue Standard of \$626 million as an adjustment to the opening balance of accumulated deficit as of January 1, 2018. The prior period comparative information has not been restated and continues to be reported under ASC Topic 605, “Revenue Recognition” (“ASC 605”) which was the accounting standards in effect for those periods.

The most significant impacts of the New Revenue Standard relate to the following:

Revenue recognized for certain patent and technology licensing arrangements has changed under the New Revenue Standard. Revenue for (i) fixed-fee arrangements (including arrangements that include minimum guaranteed amounts), (ii) variable royalty arrangements that we have concluded are fixed in substance and (iii) the fixed portion of hybrid fixed/variable arrangements is recognized upon control over the underlying intellectual property (“IP”) use right transferring to the licensee rather than upon billing under ASC 605, net of the effect of significant financing components calculated using customer-specific, risk-adjusted lending rates and recognized over time on an effective rate basis. As a consequence of the acceleration of revenue recognition and for matching purposes, all withholding taxes to be paid over the term of these licensing arrangements were expensed on the date the licensing revenue was recognized.

Adoption of the New Revenue Standard resulted in revenue recognition being accelerated for variable royalties and the variable portion of hybrid fixed/variable patent and technology licensing arrangements. Under the New Revenue Standard, royalty revenue is being recognized on the basis of management’s estimates of sales or usage, as applicable, of the licensed IP in the period of reference, with a true-up being recorded in subsequent periods based on actual sales or usage as reported by licensees (rather than upon receiving royalty reports from licensees as was the case under ASC 605).

Adoption of the New Revenue Standard also resulted in revenue recognition being accelerated for certain professional services arrangements, including arrangements consisting of significant software customization or modification and development arrangements. Under the New Revenue Standard, such arrangements are accounted for based on man-days incurred during the reporting period as compared to estimated total man-days necessary for contract completion, as the customer either controls the asset as it is created or enhanced by us or, where the asset has no alternative use to us, we are entitled to payment for performance to date and expect to fulfill the contract. Revenue recognition is no longer capped to the lesser of inputs in the period or accepted billable project milestones as was the case under ASC 605.

As part of the adoption of the New Revenue Standard, we elected to apply the following practical expedients:

We applied the practical expedient whereby we primarily charge commission costs to expense when incurred because the amortization period would be one year or less for the asset that would have been recognized from deferring these costs.

We applied the practical expedient which allowed us to reflect the aggregate effect of all contract modifications occurring before the beginning of the earliest period presented when allocating the transaction price to performance obligations.

We applied the practical expedient to not assess a contract asset or contract liability for a significant financing component if the period between the customer's payment and our transfer of goods or services is one year or less.

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. The license provides our customers with a defined right to use our innovations in the customer's own digital electronics products, systems or services, as applicable. 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 defined periods ranging for periods of up to ten years. Leading consumer product, industrial, semiconductor and system companies such as AMD, Broadcom, Cisco, Freescale, Fujitsu, IBM, Intel, Micron, Nanya, NVIDIA, Panasonic, Qualcomm, Renesas, Samsung, SK hynix, STMicroelectronics, Toshiba and Xilinx have licensed our

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patents. The vast majority of our patents were secured through our internal research and development efforts across all of our business units.

We also offer our customers technology licenses to support the implementation and adoption of our technology in their products or services. Our customers include leading companies such as IBM, Panasonic, Qualcomm, Samsung, Sony and Toshiba. Our technology license offerings include a range of technologies for incorporation into our customers' products and systems. We also offer a range of services as part of our technology licenses which can include know-how and technology transfer, product design and development, system integration, and other services. These technology license agreements may have both a fixed price (non-recurring) component and ongoing use fees and in some cases, royalties. Further, under technology licenses, our customers typically receive licenses to our patents necessary to implement these solutions in their products with specific rights and restrictions to the applicable patents elaborated in their individual contracts with us.

Revenues from royalties accounted for 56%, 74% and 79% of our consolidated revenue for the years ended December 31, 2018, 2017 and 2016, respectively.

The remainder of our revenue is product revenue, contract services and other revenue, which includes our product sales, IP core licenses, software licenses and related implementation, support and maintenance fees, and engineering services fees. The timing and amounts invoiced to customers can vary significantly depending on specific contract terms and can therefore have a significant impact on deferred revenue or account receivables in any given period. Product revenue accounted for 17%, 9% and 8% of our consolidated revenue for the years ended December 31, 2018, 2017 and 2016, respectively. Contract and other revenue accounted for 27%, 17% and 14% of our consolidated revenue for the years ended December 31, 2018, 2017 and 2016, respectively. As we continue to execute on our strategy to augment our traditional patent licensing business model to provide additional technology, products and services, product revenue and related cost of product revenue were reclassified from contract and other revenue and cost of contract and other revenue, respectively, during the second quarter of 2017.

Expenses

Cost of product revenue for 2018 decreased approximately \$5.5 million to \$18.3 million from \$23.8 million as compared to 2017 primarily due to decreased cost of sales associated with the closure of the lighting division announced in the first quarter of 2018, offset by increased cost of sales associated with higher sales of memory products.

Engineering expenses continue to play a key role in our efforts to maintain product innovations. Our engineering expenses for 2018 decreased \$10.8 million as compared to 2017 primarily due to decreased amortization costs of \$11.4 million, prototyping costs of \$1.8 million and depreciation expense of \$1.4 million, offset by increased consulting expenses of \$1.2 million, allocated information technology costs of \$1.1 million, engineering development tool costs of \$1.0 million and stock-based compensation expense of \$0.4 million.

Sales, general and administrative expenses for 2018 decreased \$7.0 million as compared to 2017 primarily due to decreased stock-based compensation expense of \$6.0 million primarily due to the termination of our former chief executive officer at the end of June 2018, sales and marketing costs of \$1.2 million and consulting costs of \$1.1 million, offset by increased facilities costs of \$1.0 million and recruiting costs of \$0.6 million.

Intellectual Property

As of December 31, 2018, our semiconductor, lighting, security and other technologies are covered by 2,094 U.S. and foreign patents. 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 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. 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.

Trends

There are a number of trends that may have a material impact on us in the future, including but not limited to, the evolution of memory and SerDes technology, adoption of mobile payment, smart ticketing and security solutions, the use and adoption of our inventions or technologies generally, industry consolidation, and global economic conditions with the resulting impact on sales of consumer electronic systems. In addition, as discussed under “Results of Operations” below, our adoption of the New

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Revenue Standard will have a significant impact on our revenue trends as compared to prior periods in which we reported revenue under ASC 605.

We have a high degree of revenue concentration. Our top five customers for each reporting period represented approximately 49% of our revenue for 2018 as compared to 55% in 2017 and 63% in 2016. The particular customers which account for revenue concentration have varied from period-to-period as a result of the addition of new contracts, expiration of existing contracts, renewals of existing contracts, industry consolidation and the volumes and prices at which the customers have recently sold to their customers. These variations are expected to continue in the foreseeable future.

Our revenue from companies headquartered outside of the United States accounted for approximately 44% in 2018 as compared to 58% in 2017 and 64% in 2016. We expect that revenue derived from international customers will continue to represent a significant portion of our total revenue in the future. To date, the majority of the revenue from international customers has been denominated in U.S. dollars. However, to the extent that such customers' sales to their customers are not denominated in U.S. dollars, any revenue 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 revenue. We do not use financial instruments to hedge foreign exchange rate risk. For additional information concerning international revenue, see Note 6, "Segments and Major Customers," of Notes to Consolidated Financial Statements of this Form 10-K.

Our licensing cycle for new licensees as well as renewals for existing licensees is lengthy, costly and unpredictable without any degree of certainty. We may incur costs in any particular period before any associated revenue stream begins, if at all. Our lengthy license negotiation cycles could make our future revenue difficult to predict because we may not be successful in entering into licenses with our customers in the amounts projected, or on our anticipated timelines.

The semiconductor industry is intensely competitive and highly cyclical, limiting our visibility with respect to future sales. To the extent that macroeconomic fluctuations negatively affect our principal customers, the demand for our products and technology may be significantly and adversely impacted and we may experience substantial period-to-period fluctuations in our operating results.

The royalties we receive from our semiconductor customers are partly a function of the adoption of our technologies by system companies. Many system companies purchase semiconductors containing our technologies from our customers and do not have a direct contractual relationship with us. Our customers generally do not provide us with details as to the identity or volume of licensed semiconductors purchased by particular system companies. As a result, we face difficulty in analyzing the extent to which our future revenue will be dependent upon particular system companies.

Global demand for effective security technologies continues to increase. In particular, highly integrated devices such as smart phones are increasingly used for applications requiring security such as mobile payments, corporate information and user data. Our RSD operating segment is primarily focused on positioning its DPA countermeasures, security cores, CryptoManager™ technology solutions, and the introduction of in-field applications mobile payments and smart ticketing solutions to our offerings to capitalize on these trends and growing adoption among technology partners and customers.

Cost of product revenue, engineering costs as well as sales, general and administrative expenses in the aggregate decreased and as a percentage of revenue increased in 2018 as compared to the prior year. In the near term, we expect these costs in the aggregate to be higher as we intend to continue to make investments in the infrastructure and technologies required to increase our product innovation in semiconductor, security, mobile payments, smart cards and other technologies. In addition, while we have not been involved in material litigation since 2014, to the extent litigation is again necessary, our expectations on the amount and timing of any future general and administrative costs

are uncertain.

As a part of our overall business strategy, from time to time, we evaluate businesses and technologies for potential acquisition that are aligned with our core business and designed to supplement our growth, including the acquisitions of SCS, the assets of the Snowbush IP group and the Memory Interconnect Business during 2016. Similarly, we evaluate our current businesses and technologies that are not aligned with our core business for potential divestiture.

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Results of Operations

On January 1, 2018, we adopted ASC 606. Consistent with the modified retrospective adoption method, our results of operations for periods prior to our adoption of ASC 606 remain unchanged as revenue for the years ended December 31, 2017 and 2016 was recognized under ASC 605. Therefore, the periods are not directly comparable.

The adoption of ASC 606 limits the comparability of revenue and certain expenses presented in the results of operations for the year ended December 31, 2018, when compared to the same periods in 2017 and 2016. For additional information on the impact of the new accounting standard on our revenue, see Note 3, "Recent Accounting Pronouncements," of Notes to Consolidated Financial Statements of this Form 10-K.

The following table sets forth, for the periods indicated, the percentage of total revenue represented by certain items reflected in our consolidated statements of operations:

	Years Ended December 31,		
	2018	2017	2016
Revenue:			
Royalties	56.4 %	73.7 %	78.6 %
Product revenue	16.7 %	9.3 %	7.7 %
Contract and other revenue	26.9 %	17.0 %	13.7 %
Total revenue	100.0 %	100.0 %	100.0 %
Operating costs and expenses:			
Cost of product revenue*	7.9 %	6.1 %	6.3 %
Cost of contract and other revenue	15.3 %	14.1 %	13.6 %
Research and development*	68.5 %	37.9 %	38.6 %
Sales, general and administrative*	44.9 %	28.2 %	28.3 %
Restructuring charges	1.0 %	— %	— %
Impairment of in-process research and development intangible asset	— %	— %	5.4 %
Change in contingent consideration liability	— %	— %	(2.0) %
Gain from sale of intellectual property	— %	(0.1) %	— %
Gain from settlement	— %	— %	(0.2) %
Total operating costs and expenses	137.6 %	86.2 %	90.0 %
Operating income (loss)	(37.6) %	13.8 %	10.0 %
Interest income and other income (expense), net	14.1 %	0.4 %	0.5 %
Loss on extinguishment of debt	— %	(0.3) %	— %
Interest expense	(7.0) %	(3.5) %	(3.8) %
Interest and other income (expense), net	7.1 %	(3.4) %	(3.3) %
Income (loss) before income taxes	(30.5) %	10.4 %	6.7 %
Provision for income taxes	37.8 %	16.2 %	4.7 %
Net income (loss)	(68.3) %	(5.8) %	2.0 %

* Includes stock-based compensation:

Cost of product revenue	0.0%	0.0%	0.0%
Research and development	5.4%	3.1%	2.7%
Sales, general and administrative	4.0%	3.9%	3.5%

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Segment Results

Revenue from the MID reportable segment decreased approximately \$112.2 million to \$168.5 million for the year ended December 31, 2018 from \$280.7 million for the year ended December 31, 2017. The decrease was primarily due to the adoption of ASC 606 in 2018 as discussed above, partially offset by higher volume of memory product sales.

Segment operating income from the MID reportable segment decreased approximately \$121.2 million to \$73.5 million for the year ended December 31, 2018 from \$194.7 million for the year ended December 31, 2017. The decrease was primarily due to the decrease in revenue as discussed above, an increase in cost of sales related to higher sales of memory products, increased headcount related costs due to higher number of employees in 2018 and higher consulting costs, partially offset by lower prototyping costs.

Revenue from the RSD reportable segment decreased approximately \$36.5 million to \$60.2 million for the year ended December 31, 2018 from \$96.7 million for the year ended December 31, 2017. The decrease was primarily due to the adoption of ASC 606 in 2018 as discussed above.

Segment operating income from the RSD reportable segment decreased approximately \$39.6 million to \$7.1 million for the year ended December 31, 2018 from \$46.7 million for the year ended December 31, 2017. The decrease was primarily due to the decrease in revenue as discussed above, an increased headcount related costs due to higher number of employees in 2018, partially offset by lower cost of sales.

Revenue from the Other segment decreased approximately \$13.3 million to \$2.4 million for the year ended December 31, 2018 from \$15.7 million for the year ended December 31, 2017. The decrease was due to the closing of our lighting division in the first quarter of 2018.

Segment operating loss from the Other segment decreased approximately \$6.0 million to \$12.1 million for the year ended December 31, 2018 from \$18.1 million for the year ended December 31, 2017. The decrease was due to the closing of our lighting division in the first quarter of 2018.

Revenue from the MID reportable segment increased approximately \$40.9 million to \$280.7 million for the year ended December 31, 2017 from \$239.8 million for the year ended December 31, 2016. The increase was primarily due to higher royalty revenue from Marvell Technology Group, a renewed license agreement with STMicroelectronics, Western Digital, Winbond Electronics, higher sales from technology projects and higher sales of memory products from the Memory Interconnect Business acquisition.

Segment operating income from the MID reportable segment increased approximately \$23.3 million to \$194.7 million for the year ended December 31, 2017 from \$171.4 million for the year ended December 31, 2016. The increase was primarily due to increased revenue as discussed above, partially offset by increased headcount related costs due to higher number of employees and increased cost of sales related to sales of memory products.

Revenue from the RSD reportable segment increased approximately \$20.5 million to \$96.7 million for the year ended December 31, 2017 from \$76.2 million for the year ended December 31, 2016. The increase was primarily due to higher royalty revenue from NVIDIA, Western Digital and higher revenue from Renesas and other security technology development projects, offset by lower royalty revenue from Xilinx.

Segment operating income from the RSD reportable segment increased approximately \$22.4 million to \$46.7 million for the year ended December 31, 2017 from \$24.3 million for the year ended December 31, 2016. The increase was primarily due to increased revenue as discussed above and decreased headcount related costs, partially offset by increased consulting costs.

Revenue from the Other segment decreased approximately \$4.9 million to \$15.7 million for the year ended December 31, 2017 from \$20.6 million for the year ended December 31, 2016. The decrease was primarily due to lower royalties from technology licenses associated with lighting products and decreased revenue from lighting technology development projects, offset by increased sales of light guide products.

Segment operating loss from the Other segment increased approximately \$8.3 million to \$18.1 million for the year ended December 31, 2017 from \$9.8 million for the year ended December 31, 2016. The increase was primarily due to decreased revenue as discussed above.

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	Years Ended			2017 to	2016 to		
	December 31,			2018	2017		
	2018	2017	2016	Change	Change		
	(Dollars in millions)						
Total Revenue							
Royalties	\$ 130.5	\$ 289.6	\$ 264.6	(55.0)%	9.4	%	
Product revenue	38.7	36.5	26.1	6.0	%	40.1	%
Contract and other revenue	62.0	67.0	45.9	(7.4)	%	45.9	%
Total revenue	\$ 231.2	\$ 393.1	\$ 336.6	(41.2)%	16.8	%	

Royalty Revenue

Our royalty revenue, which includes patent and technology license royalties, decreased approximately \$159.1 million to \$130.5 million for the year ended December 31, 2018 from \$289.6 million for 2017. The decrease was due primarily to the change in revenue recognition whereby we no longer recognize revenue at the time billings become due and collectable. Upon adoption of ASC 606 in the first quarter of 2018, we now recognize revenue at the inception of certain fixed-fee licensing arrangements when our performance obligations are met. Under the previous revenue recognition standard (ASC 605), our revenue for the year ended would have been higher as discussed under Note 3, "Recent Accounting Pronouncements," of Notes to Consolidated Financial Statements of this Form 10-K. With changes in revenue recognition due to the adoption of ASC 606 in 2018, our royalty revenue for 2018 was significantly lower than that for 2017 primarily due to the change from the adoption of ASC 606 as noted above. This accounting change will not impact billings or the cash flow from these arrangements. Furthermore, we may experience greater variability in quarterly and annual revenue in future periods as a result of the revenue accounting treatment applied to future fixed-fee licensing arrangements.

Our royalty revenue increased approximately \$25.0 million to \$289.6 million for the year ended December 31, 2017 from \$264.6 million for 2016. The increase was due to higher royalty revenue from GLOBALFOUNDRIES, NVIDIA, Marvell Technology Group, a renewed license agreement with STMicroelectronics, Western Digital, Winbond Electronics, and various other customers, offset by lower royalty revenue from AMD, Broadcom, Eaton, Fujitsu, MediaTek, SK hynix, Xilinx, and various other customers.

We are continuously in negotiations for licenses with prospective customers. We expect patent royalties will continue to vary from period to period based on our success in adding new customers, renewing or extending existing agreements, 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 or hybrid in nature. We also expect that our technology royalties will continue to vary from period to period based on our customers' shipment volumes, sales prices, and product mix.

Royalty Revenue by Reportable Segment

Royalty revenue from the MID reportable segment decreased approximately \$123.7 million to \$105.4 million for the year ended December 31, 2018 from \$229.1 million for 2017. The decrease was due to the adoption of ASC 606 in 2018 as discussed above.

Royalty revenue from the RSD reportable segment decreased approximately \$33.8 million to \$24.7 million for the year ended December 31, 2018 from \$58.5 million for 2017. The decrease was due to the adoption of ASC 606 in 2018 as discussed above.

Royalty revenue from the Other segment decreased \$1.6 million to \$0.4 million for the year ended December 31, 2018 from \$2.0 million for 2017. The decrease was due to the closing of our lighting division in the first quarter of 2018. Royalty revenue from the MID reportable segment increased approximately \$16.4 million to \$229.1 million for the year ended December 31, 2017 from \$212.7 million for 2016. The increase was due to higher royalty revenue from Marvell Technology Group, a renewed license agreement with STMicroelectronics, Western Digital, Winbond Electronics, and various other customers, offset by lower royalty revenue from AMD, Broadcom, MediaTek, SK hynix and Xilinx.

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Royalty revenue from the RSD reportable segment increased approximately \$11.6 million to \$58.5 million for the year ended December 31, 2017 from \$46.9 million for 2016. The increase was primarily due to higher royalty revenue from NVIDIA, Western Digital and various other customers, offset by lower royalty revenue from Xilinx.

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Royalty revenue from the Other segment decreased \$3.1 million to \$2.0 million for the year ended December 31, 2017 from \$5.1 million for 2016. The decrease was due to lower royalties from technology licenses associated with lighting products.

Product Revenue

Product revenue consists of revenue from the sale of memory, security and lighting products. Product revenue increased approximately \$2.2 million to \$38.7 million for the year ended December 31, 2018 from \$36.5 million for 2017. The increase was primarily due to higher sales of memory products, partially offset by lower sales of lighting products, as a result of closing our lighting division in the first quarter of 2018.

Product revenue increased approximately \$10.4 million to \$36.5 million for the year ended December 31, 2017 from \$26.1 million for 2016. The increase was primarily due to sales of security products to Qualcomm and memory products from the Memory Interconnect Business.

We believe that product revenue will increase in 2019, mainly from the sale of our memory products. Our ability to continue to grow product revenue is dependent on, among other things, our ability to continue to obtain orders from customers and our ability to meet our customers' demands.

Product Revenue by Reportable Segments

Product revenue from the MID reportable segment increased approximately \$16.1 million to \$36.4 million for the year ended December 31, 2018 from \$20.3 million for 2017, due to higher volume of memory product sales.

Product revenue from the RSD reportable segment decreased approximately \$4.2 million to \$1.4 million for the year ended December 31, 2018 from \$5.6 million for 2017, primarily due to lower sales of security products.

Product revenue from the Other segment decreased approximately \$9.7 million to \$0.9 million for the year ended December 31, 2018 from \$10.6 million for 2017. The decrease was due to lower sales of lighting products as a result of closing our lighting division in the first quarter of 2018.

Product revenue from the MID reportable segment increased approximately \$7.4 million to \$20.3 million for the year ended December 31, 2017 from \$12.9 million for 2016, due to higher sales of memory products from the Memory Interconnect Business acquisition.

Product revenue from the RSD reportable segment increased approximately \$1.9 million to \$5.6 million for the year ended December 31, 2017 from \$3.7 million for 2016, primarily due to higher revenue from Qualcomm, offset by lower sales to various other customers.

Product revenue from the Other segment increased approximately \$1.1 million to \$10.6 million for the year ended December 31, 2017 from \$9.5 million for 2016, due to higher sales of light guide products.

Contract and Other Revenue

Contract and other revenue consists of revenue from technology development projects. Contract and other revenue decreased approximately \$5.0 million to \$62.0 million for the year ended December 31, 2018 from \$67.0 million for 2017. The decrease was primarily due to lower revenue from various memory and lighting technology development projects, partially offset by higher revenue from various security technology development projects.

Contract and other revenue increased approximately \$21.1 million to \$67.0 million for the year ended December 31, 2017 from \$45.9 million for 2016. The increase was primarily due to increased memory and security technology development projects, including revenue from the acquisitions during 2016, offset by decreased revenue from lighting technology development projects.

We believe that contract and other revenue will fluctuate over time based on our ongoing technology development contractual requirements, the amount of work performed, the timing of completing engineering deliverables, and the changes to work required, as well as new technology development contracts booked in the future.

Contract and Other Revenue by Reportable Segments

Contract and other revenue from the MID reportable segment decreased \$4.5 million to \$26.8 million for the year ended December 31, 2018 from \$31.3 million for 2017, due to lower revenue from various memory technology projects.

Contract and other revenue from the RSD reportable segment increased approximately \$1.6 million to \$34.1 million for the year ended December 31, 2018 from \$32.5 million for 2017, due to higher revenue from various security technology development projects.

Contract and other revenue from the Other segment decreased approximately \$2.1 million to \$1.1 million for the year ended December 31, 2018 from \$3.2 million for 2017, due to lower revenue from our lighting technology development projects as a result of closing our lighting division in the first quarter of 2018.

Contract and other revenue from the MID reportable segment increased \$17.0 million to \$31.3 million for the year ended December 31, 2017 from \$14.3 million for 2016, primarily due to higher revenue from GLOBALFOUNDRIES, Samsung and other memory technology projects, including revenue from the acquisitions in 2016.

Contract and other revenue from the RSD reportable segment increased approximately \$6.9 million to \$32.5 million for the year ended December 31, 2017 from \$25.6 million for 2016, primarily due to higher revenue from Renesas and other security technology development projects, including revenue from the acquisitions in 2016.

Contract and other revenue from the Other segment decreased approximately \$2.8 million to \$3.2 million for the year ended December 31, 2017 from \$6.0 million for 2016, primarily due to decreased revenue from lighting technology development projects.

Cost of product revenue:

	Years Ended	2017 to	2016 to
	December 31,	2018	2017
	2018	2017	2016
		Change	Change
	(Dollars in		
	millions)		

Cost of product revenue	\$18.3	\$23.8	\$21.3	(23.1)%	11.5 %
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Cost of product revenue are costs attributable to the sale of memory, security and lighting products.

For the year ended December 31, 2018 as compared to 2017, cost of product revenue decreased 23.1% primarily due to decreased cost of sales associated with the closure of the lighting division announced in the first quarter of 2018, offset by increased cost of sales associated with higher sales of memory products.

For the year ended December 31, 2017 as compared to 2016, cost of product revenue increased 11.5% primarily due to increased cost of sales associated with higher sales of memory products related to the Memory Interconnect Business acquisition in the second half of 2016.

In the near term, we expect costs of product revenue to be higher as we expect higher sales of our various products in 2019 as compared to 2018.

Engineering costs:

	Years Ended	2017 to	2016 to		
	December 31,	2018	2017		
	2018	2017	2016		
		Change	Change		
	(Dollars in millions)				
Engineering costs					
Cost of contract and other revenue	\$11.7	\$20.3	\$16.1	(42.1)%	26.1 %
Amortization of intangible assets	23.7	35.1	29.7	(32.4)%	18.2 %
Total cost of contract and other revenue	35.4	55.4	45.8	(36.1)%	21.0 %
Research and development	145.7	136.9	120.6	6.4 %	13.5 %
Stock-based compensation	12.6	12.2	9.2	3.3 %	33.0 %
Total research and development	158.3	149.1	129.8	6.2 %	14.9 %
Total engineering costs	\$193.7	\$204.5	\$175.6	(5.3)%	16.5 %

Engineering costs are allocated between cost of contract and other revenue and research and development expenses. Cost of contract and other revenue reflects the portion of the total engineering costs which are specifically devoted to individual customer development and support services as well as amortization expense related to various acquired

intellectual property for patent licensing. The balance of engineering costs, incurred for the development of applicable technologies, is charged to

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research and development. In a given period, the allocation of engineering costs between these two components is a function of the timing of the development and implementation schedules of individual customer contracts.

For the year ended December 31, 2018 as compared to 2017, total engineering costs decreased 5.3% primarily due to decreased amortization costs of \$11.4 million, prototyping costs of \$1.8 million and depreciation expense of \$1.4 million, offset by increased consulting expenses of \$1.2 million, engineering development tool costs of \$1.0 million, allocated information technology costs of \$1.1 million and stock-based compensation expense of \$0.4 million.

For the year ended December 31, 2017 as compared to 2016, total engineering costs increased 16.5% primarily due to increased headcount related expenses of \$8.1 million, increased expenses related to software design tools of \$5.5 million, increased amortization costs of \$5.4 million, increased costs associated with engineering services of \$4.2 million, increased stock-based compensation expense of \$3.0 million, increased prototyping costs of \$2.4 million, increased travel costs of \$0.9 million, increased bonus accrual expense of \$0.8 million and increased consulting costs of \$0.6 million, offset by lower depreciation expense of \$1.6 million. Most of the increases were primarily due to business acquisitions during 2016.

In the near term, we expect engineering costs to be higher as we continue to make investments in the infrastructure and technologies required to maintain our product innovation in semiconductor, security and other technologies.

Sales, general and administrative costs:

Years Ended	2017 to	2016 to
December 31,	2018	2017
2018 2017 2016	Change	Change
(Dollars in millions)		

Sales, general and administrative costs

Sales, general and administrative costs	\$94.8	\$95.8	\$83.3	(1.1)%	14.9 %
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Stock-based compensation	9.1	15.1	11.8	(39.6)%	28.4 %
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Total sales, general and administrative costs	\$103.9	\$110.9	\$95.1	(6.3)%	16.6 %
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Sales, general and administrative expenses include expenses and costs associated with trade shows, public relations, advertising, litigation, general legal, insurance and other sales, marketing and administrative efforts. Litigation expenses have historically been a significant portion of our sales, general and administrative expenses. Consistent with our business model, our licensing, sales and marketing activities aim to develop or strengthen relationships with potential new and current customers. In addition, we work with current customers through marketing, sales and technical efforts to drive adoption of their products that use our innovations and solutions, by system companies. Due to the long business development cycles we face and the semi-fixed nature of sales, general and administrative expenses in a given period, these expenses generally do not correlate to the level of revenue in that period or in recent or future periods.

For the year ended December 31, 2018 as compared to 2017, total sales, general and administrative costs decreased 6.3% primarily due to decreased stock-based compensation expense of \$6.0 million primarily due to the termination of our former chief executive officer at the end of June 2018, consulting costs of \$1.1 million and sales and marketing costs of \$1.2 million, offset by increased facilities costs of \$1.0 million and recruiting costs of \$0.6 million.

For the year ended December 31, 2017 as compared to 2016, total sales, general and administrative costs increased 16.6% primarily due to increased headcount related expenses of \$5.4 million, increased stock-based compensation expense of \$3.3 million, increased bonus accrual expense of \$3.1 million, increased sales and marketing expenses of \$2.6 million, increased consulting costs of \$2.2 million and increased travel costs of \$1.3 million, offset by decreased acquisition related costs of \$3.1 million. Most of the increases were primarily due to business acquisitions during 2016.

In the future, sales, general and administrative costs will vary from period to period based on the trade shows, advertising, legal, acquisition and other sales, marketing and administrative activities undertaken, and the change in sales, marketing and administrative headcount in any given period. In the near term, we expect our sales, general and administrative costs to remain relatively flat.

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Restructuring charges:

Years Ended	2017 to	2016 to
December 31,	2018	2017
2018	2017	2016
	Change	Change

(Dollars in millions)

Restructuring charges \$ 2.2 \$ —\$ —100.0% 0.0 %

During the first quarter of 2018, we announced our plans to close our lighting division and manufacturing operations in Brecksville, Ohio. We believed that such business was not core to our strategy and growth objectives. As a result, we recorded a charge of \$2.2 million related to employee terminations and severance costs, and facility related costs. During 2017 and 2016, we did not initiate any restructuring programs.

Refer to Note 15, “Restructuring Charges,” of Notes to Consolidated Financial Statements of this Form 10-K for further discussion.

Impairment of in-process research and development intangible asset:

Years Ended	2017 to	2016 to
December 31,	2018	2017
2018	2017	2016
	Change	Change

(Dollars in millions)

Impairment of in-process research and development intangible asset \$ —\$ —\$ 18.3 —% (100.0)%

During 2018 and 2017, we did not record a charge for the impairment of any intangible assets or goodwill.

During the fourth quarter of 2016, we recorded a charge of \$18.3 million related to the impairment of the in-process research and development intangible asset acquired in the acquisition of Snowbush IP. The impairment of this intangible asset resulted from a delay in the market served by this initiative. This delay will not impact the short-term revenue expectations but may impact our revenue expectations several years into the future. This impairment was partially offset by a \$6.8 million reduction of acquisition purchased consideration related to this product line.

Change in contingent consideration liability:

Years Ended	2017 to	2016 to
December 31,	2018	2017
2018	2017	2016
	Change	Change

(Dollars in millions)

Change in contingent consideration liability \$ —\$ —\$ (6.8) —% (100.0)%

During the fourth quarter of 2016, we recorded a reduction in our contingent consideration liability of \$6.8 million resulting in a gain in our Consolidated Statements of Operations of this Form 10-K. See the “Impairment of in-process research and development intangible asset” section discussed above for further details.

Interest and other income (expense), net:

Years Ended	2017 to	2016 to
December 31,	2018	2017
2018	2017	2016
	Change	Change

(Dollars in millions)

Interest income and other income (expense), net	\$32.6	\$1.4	\$1.7	NM*	(20.5)%
Loss on extinguishment of debt	—	(1.1)	—	(100.0)%	100.0%
Interest expense	(16.3)	(13.7)	(12.7)	18.7%	7.7%
Interest and other income (expense), net	\$16.3	\$(13.4)	\$(11.0)	NM*	21.9%

* NM — percentage is not meaningful

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Interest income and other income (expense), net, consists primarily of interest income related to the interest income of \$27.2 million for the year ended December 31, 2018 due to the significant financing component of licensing agreements as a result of the adoption of the New Revenue Standard as of January 1, 2018 as well as interest income generated from investments in high quality fixed income securities and any gains or losses from the re-measurement of our monetary assets or liabilities denominated in foreign currencies.

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Loss on extinguishment of debt relates to the extinguishment of a portion of the 2018 Notes during 2017. See Note 10, “Convertible Notes,” of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

Interest expense consists of interest expense associated with our imputed facility lease obligations on the Sunnyvale and Ohio facilities and non-cash interest expense related to the amortization of the debt discount and issuance costs on the 1.375% convertible senior notes due 2023 (the “2023 Notes”) and the 1.125% convertible senior notes due 2018 (the “2018 Notes”), as well as the coupon interest related to these notes. Interest expense increased in 2018 as compared to the same period in 2017 primarily due to the full year of interest expense related to the 2023 Notes offset by the maturing of the 2018 Notes in the third quarter of 2018. Interest expense increased in 2017 as compared to the same period in 2016 primarily due to the issuance of the 2023 Notes in the fourth quarter of 2017. For the years ended December 31, 2018, 2017 and 2016, we recognized \$4.3 million, \$4.4 million and \$4.4 million, respectively, of interest expense in connection with the imputed financing obligations in our statements of operations. We expect our non-cash interest expense to increase steadily as the notes reach maturity. See Note 10, “Convertible Notes,” of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

Provision for income taxes:

	Years Ended December 31,			2017 to	
	2018	2017	2016	2018	2016 to 2017
	(Dollars in millions)			Change	Change
Provision for income taxes	\$87.3	\$63.9	\$15.8	36.8 %	NM*
Effective tax rate	(123.6)%	155.8 %	69.9 %		

*NM — percentage is not meaningful

Our effective tax rate for the year ended December 31, 2018 was different from the U.S. statutory tax rate primarily due to the establishment of a full valuation allowance on U.S. federal deferred tax assets. Our effective tax rate for the year ended December 31, 2017 was different from the U.S. statutory rate primarily due to the deferred tax asset valuation allowance on expiring 2010 foreign tax credits and certain federal research and development credits, and the re-measurement of deferred taxes from a 35% to 21% tax rate due to U.S. tax reform. Our effective tax rate for the year ended December 31, 2016 was different from the U.S. statutory rate primarily due to income tax expense recognized from exercises and expiration of out-of-the-money fully vested shares from our equity incentive plans.

We recorded a provision for incomes taxes of \$87.3 million for the year ended December 31, 2018, which primarily resulted from establishing a full valuation allowance on our U.S. federal deferred tax assets. For the year ended December 31, 2018, we paid withholding taxes of \$20.4 million. We recorded a provision for incomes taxes of \$63.9 million for the year ended December 31, 2017, which was primarily comprised of our valuation allowance on unused 2010 foreign tax credits and certain federal research and development credits, and our deferred taxes re-measurements following U.S. tax reform. For the year ended December 31, 2017, we paid withholding taxes of \$20.5 million. We recorded a provision for income taxes of \$15.8 million for the year ended December 31, 2016, which was primarily comprised of withholding taxes, other foreign taxes and current state taxes. For the year ended December 31, 2016, we paid withholding taxes of \$22.0 million.

On December 22, 2017, the Tax Cuts and Jobs Act (“the Tax Act”) was enacted into law in the United States. The Tax Act, among other things, lowered U.S. corporate income tax rates from 35% to 21%, implemented a territorial tax system, and imposed a one-time transition tax on deemed repatriated earnings of non-U.S. subsidiaries.

The U.S. tax law changes, including limitations on various business deductions such as executive compensation under Internal Revenue Code §162(m), will not impact our federal tax expense in the short-term due to our tax credit carryovers and associated valuation allowance. The Tax Act’s new international rules, including Global Intangible Low-Taxed Income (“GILTI”), Foreign Derived Intangible Income (“FDII”), and Base Erosion Anti-Avoidance Tax (“BEAT”) are effective beginning in 2018. We have included these effects of the Tax Act in our financial statements. We periodically evaluate the realizability of our net deferred tax assets based on all available evidence, both positive and negative. During the third quarter of 2018, we assessed the changes in our underlying facts and circumstances and

evaluated the realizability of our existing deferred tax assets based on all available evidence, both positive and negative, and the weight accorded to each, and concluded a full valuation allowance associated with U.S. federal and California deferred tax assets was appropriate. The basis for this conclusion was derived primarily from the fact that we completed our forecasting process during the third quarter of 2018. At a domestic level, losses are expected in future periods in part due to the impact of the adoption of ASC 606. In addition, the decrease in the U.S. federal tax rate from 35% to 21% as a result of U.S. tax reform has further reduced our ability to utilize our deferred tax assets. In light of the above factors, we concluded that it is not more likely than

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not that we can realize our U.S. deferred tax assets. As such, we have set up and maintain a full valuation allowance against our U.S. federal deferred tax assets.

Liquidity and Capital Resources

	December 31,		
	2018	2017	2016
	(In millions)		
Cash and cash equivalents	\$ 115.9	\$ 225.9	
Marketable securities	161.9	103.5	
Total cash, cash equivalents, and marketable securities	\$ 277.8	\$ 329.4	
	Years Ended December 31,		
	2018	2017	2016
	(In millions)		
Net cash provided by operating activities	\$ 87.1	\$ 117.4	\$ 95.6
Net cash used in investing activities	\$(68.0)	\$(75.5)	\$(105.2)
Net cash provided by (used in) financing activities	\$(127.7)	\$ 46.5	\$ 2.7

Liquidity

We currently anticipate that existing cash, cash equivalents and marketable securities balances and cash flows from operations will be adequate to meet our cash needs for at least the next 12 months. Additionally, the majority of our cash and cash equivalents is in the United States. Our cash needs for the year ended December 31, 2018 were funded primarily from cash collected from our customers.

We do not anticipate any liquidity constraints as a result of either the current credit environment or investment fair value fluctuations. Additionally, we have the intent and ability to hold our debt investments that have unrealized losses in accumulated other comprehensive gain (loss) for a sufficient period of time to allow for recovery of the principal amounts invested. Additionally, we have no significant exposure to European sovereign debt. We continually monitor the credit risk in our portfolio and mitigate our credit risk exposures in accordance with our policies.

As a part of our overall business strategy, from time to time, we evaluate businesses and technologies for potential acquisitions that are aligned with our core business and designed to supplement our growth.

To provide us with more flexibility in returning capital back to our stockholders, on January 21, 2015, our Board authorized a share repurchase program authorizing the repurchase of up to an aggregate of 20.0 million shares. During the first quarter of 2018, we entered into an accelerated share repurchase program with Citibank N.A. to repurchase an aggregate of \$50.0 million of our common stock and received an initial delivery of 3.1 million shares, which were retired and recorded as a \$40.0 million reduction to stockholders' equity. The remaining \$10.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to our stock. During the second quarter of 2018, the accelerated share repurchase program was completed and we received an additional 0.7 million shares of our common stock as the final settlement of the accelerated share repurchase program. We may continue to tactically execute our share repurchase program from time to time.

As of December 31, 2018, there remained an outstanding authorization to repurchase approximately 3.6 million shares of our outstanding common stock under the current share repurchase program. See "Share Repurchase Program" below.

Operating Activities

Cash provided by operating activities of \$87.1 million for the year ended December 31, 2018 was primarily attributable to the cash generated from customer licensing, software license and related implementation, support and maintenance fees, product sales and engineering services fees. Changes in operating assets and liabilities for the year ended December 31, 2018 primarily included increases in unbilled receivables, accounts receivable and prepaids and other current assets, offset by decreases in accounts payable and accrued salaries and benefits and other liabilities.

Cash provided by operating activities of \$117.4 million for the year ended December 31, 2017 was primarily attributable to cash generated from customer licensing, software license and related implementation, support and maintenance fees, product sales and engineering services fees. Changes in operating assets and liabilities for the year ended December 31, 2017 primarily included increases in accounts receivable and accrued salaries and benefits and other liabilities as well as decreases in prepaids and other current assets.

Cash provided by operating activities of \$95.6 million for the year ended December 31, 2016 was primarily attributable to the cash generated from customer licensing, software license and related implementation, support and maintenance fees, product sales and engineering services fees. Changes in operating assets and liabilities for the year ended December 31, 2016 primarily included a decrease in accrued salaries and benefits and other liabilities mainly due to the payout of the Corporate Incentive Plan and increases in deferred revenue and inventory.

Investing Activities

Cash used in investing activities of \$68.0 million for the year ended December 31, 2018 primarily consisted of purchases of available-for-sale marketable securities of \$282.1 million, \$10.8 million paid to acquire property, plant and equipment and \$3.0 million paid for investment in a privately held company, offset by proceeds from the maturities of available-for-sale marketable securities of \$223.1 million, proceeds from the sale of assets held for sale of \$3.8 million and proceeds from the sale of an equity security of \$1.3 million.

Cash used in investing activities of \$75.5 million for the year ended December 31, 2017 primarily consisted of cash paid for purchases of available-for-sale marketable securities of \$102.5 million and \$9.4 million paid to acquire property, plant and equipment, offset by proceeds from the maturities and sales of available-for-sale marketable securities of \$32.0 million and \$4.5 million, respectively.

Cash used in investing activities of \$105.2 million for the year ended December 31, 2016 primarily consisted of cash paid for the acquisition of SCS of \$92.6 million, net of cash acquired of \$12.1 million, cash paid for the acquisition of the Memory Interconnect Business of \$90.0 million, cash paid for the acquisition of the assets of the Snowbush IP group assets of \$32.0 million, cash paid for purchases of available-for-sale marketable securities of \$54.9 million, \$8.6 million paid to acquire property, plant and equipment, offset by proceeds from the maturities and sales of available-for-sale marketable securities of \$110.1 million and \$50.5 million, respectively.

Financing Activities

Cash used in financing activities was \$127.7 million for the year ended December 31, 2018 and was primarily due to the repayment of the remaining aggregate principal of the 2018 Notes amounting to \$81.2 million, which became due in August 2018, an aggregate payment of \$50.0 million to Citibank N.A., as part of our accelerated share repurchase program, and \$6.8 million in payments of taxes on restricted stock units, offset by \$11.4 million proceeds from the issuance of common stock under equity incentive plans.

Cash provided by financing activities was \$46.5 million for the year ended December 31, 2017 and was primarily due to \$172.5 million from the issuance of the 2023 Notes, \$23.2 million from the issuance of warrants and \$15.8 million proceeds from the issuance of common stock under equity incentive plans, offset by \$72.3 million paid for the repurchase of \$56.8 million aggregate principal amount of the 2018 Notes and \$15.5 million paid primarily for the conversion feature of the repurchased 2018 Notes, an aggregate payment of \$50.0 million to Barclays Bank PLC, as

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part of our accelerated share repurchase program, \$33.5 million related to the purchase of the Convertible Note Hedge Transactions, \$5.1 million in payments of taxes on restricted stock units and \$3.3 million in issuance costs related to the issuance of the 2023 Notes.

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Cash provided by financing activities was \$2.7 million for the year ended December 31, 2016. We received proceeds of \$15.4 million from the issuance of common stock under equity incentive plans, offset by the payment of the additional purchase consideration from the SCS acquisition of \$10.2 million and \$3.1 million in payments of taxes on restricted stock units.

Contractual Obligations

On December 15, 2009, we entered into a lease agreement for approximately 125,000 square feet of office space located at 1050 Enterprise Way in Sunnyvale, California commencing on July 1, 2010 and expiring on June 30, 2020. The office space is used for our corporate headquarters, as well as engineering, sales, marketing and administrative operations and activities. We have two options to extend the lease for a period of 60 months each and a one-time option to terminate the lease after 84 months in exchange for an early termination fee. Pursuant to the terms of the lease, the landlord agreed to reimburse us approximately \$9.1 million, which was received by the year ended December 31, 2011. We recognized the reimbursement as an additional imputed financing obligation as such payment from the landlord is deemed to be an imputed financing obligation. On November 4, 2011, to better plan for future expansion, we entered into an amended lease for our Sunnyvale facility for approximately an additional 31,000 square feet of space commencing on March 1, 2012 and expiring on June 30, 2020. Additionally, a tenant improvement allowance to be provided by the landlord was approximately \$1.7 million. On September 29, 2012, we entered into a second amended Sunnyvale lease to reduce the tenant improvement allowance to approximately \$1.5 million. On January 31, 2013, we entered into a third amendment to the Sunnyvale lease to surrender the 31,000 square-foot space from the first amendment back to the landlord and recorded a total charge of \$2.0 million related to the surrender of the amended lease.

On March 8, 2010, we entered into a lease agreement for approximately 25,000 square feet of office and manufacturing areas, located in Brecksville, Ohio. The office space was used for RLD's engineering activities while the manufacturing space is used for the manufacturer of prototypes. This lease was amended on September 29, 2011 to expand the facility to approximately 51,000 total square feet and the amended lease will expire on July 31, 2019. We have an option to extend the lease for a period of 60 months. On January 30, 2018, we announced our plans to close our lighting division and manufacturing operations in Brecksville, Ohio, and began the process to exit the facilities and sell the related equipment. Refer to Note 15, "Restructuring Charges," of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

We undertook a series of structural improvements to ready the Sunnyvale and Brecksville facilities for our use. Since certain improvements to be constructed by us were considered structural in nature and we were responsible for any cost overruns, for accounting purposes, we were treated in substance as the owner of the construction project during the construction period. At the completion of each construction, we concluded that we retained sufficient continuing involvement to preclude de-recognition of the building under the FASB authoritative guidance applicable to the sale leasebacks of real estate. As such, we continue to account for the building as owned real estate and to record an imputed financing obligation for our obligation to the legal owners.

Monthly lease payments on the facility are allocated between the land element of the lease (which is accounted for as an operating lease) and the imputed financing obligation. The imputed financing obligation is amortized using the effective interest method and the interest rate was determined in accordance with the requirements of sale leaseback accounting. For the years ended December 31, 2018, 2017 and 2016, we recognized in our Consolidated Statements of Operations \$4.3 million, \$4.4 million and \$4.4 million, respectively, of interest expense in connection with the imputed financing obligation on these facilities. At December 31, 2018 and 2017, the imputed financing obligation balance in connection with these facilities was \$37.6 million and \$38.3 million, respectively, which was primarily classified under long-term imputed financing obligation.

On November 17, 2017, we entered into an Indenture with U.S. Bank, National Association, as trustee, relating to the issuance by us of \$172.5 million aggregate principal amount of the 2023 Notes. The aggregate principal amount of the 2023 notes as of December 31, 2018 was \$172.5 million, offset by unamortized debt discount and unamortized debt issuance costs of \$28.5 million and \$2.0 million, respectively, on the accompanying consolidated balance sheets. The unamortized discount related to the 2023 Notes is being amortized to interest expense using the effective method over

the remaining 4.1 years until maturity of the 2023 Notes on February 1, 2023. See Note 10, "Convertible Notes," of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

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As of December 31, 2018, our material contractual obligations are as follows (in thousands):

	Total	2019	2020	2021	2022	2023
Contractual obligations (1)						
Imputed financing obligation (2)	\$8,081	\$5,677	\$2,404	\$—	\$—	\$—
Leases and other contractual obligations	20,548	5,999	5,117	5,193	3,271	968
Software licenses (3)	12,002	7,510	2,995	1,497	—	—
Convertible notes	172,500	—	—	—	—	172,500
Interest payments related to convertible notes	10,680	2,372	2,372	2,372	2,372	1,192
Total	\$223,811	\$21,558	\$12,888	\$9,062	\$5,643	\$174,660

The above table does not reflect possible payments in connection with uncertain tax benefits of approximately \$23.5 million including \$21.4 million recorded as a reduction of long-term deferred tax assets and \$2.1 million in (1) long-term income taxes payable, as of December 31, 2018. As noted in Note 16, "Income Taxes," of Notes to Consolidated Financial Statements of this Form 10-K, although it is possible that some of the unrecognized tax benefits could be settled within the next 12 months, we cannot reasonably estimate the outcome at this time.

With respect to the imputed financing obligation, the main components of the difference between the amount (2) reflected in the contractual obligations table and the amount reflected on the Consolidated Balance Sheets are the interest on the imputed financing obligation and the estimated common area expenses over the future periods. The amount includes the amended Ohio lease and the amended Sunnyvale lease.

(3) We have commitments with various software vendors for agreements generally having terms longer than one year.
Share Repurchase Program

On January 21, 2015, our Board approved a share repurchase program authorizing the repurchase of up to an aggregate of 20.0 million shares. Share repurchases under the plan may be made through the open market, established plans or privately negotiated transactions in accordance with all applicable securities laws, rules, and regulations. There is no expiration date applicable to the plan.

On March 5, 2018, we initiated an accelerated share repurchase program with Citibank N.A. The accelerated share repurchase program is part of the broader share repurchase program previously authorized by the Company's Board on January 21, 2015. Under the accelerated share repurchase program, we pre-paid to Citibank N.A., the \$50.0 million purchase price for our common stock and, in turn, we received an initial delivery of approximately 3.1 million shares of our common stock from Citibank N.A., in the first quarter of 2018, which were retired and recorded as a \$40.0 million reduction to stockholders' equity. The remaining \$10.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to our stock. During the second quarter of 2018, the accelerated share repurchase program was completed and we received an additional 0.7 million shares of our common stock as the final settlement of the accelerated share repurchase program. There were no other repurchases of our common stock during 2018.

On May 1, 2017, we initiated an accelerated share repurchase program with Barclays Bank PLC. The accelerated share repurchase program is part of the broader share repurchase program previously authorized by our Board on January 21, 2015. Under the accelerated share repurchase program, we pre-paid to Barclays Bank PLC, the \$50.0 million purchase price for our common stock and, in turn, we received an initial delivery of approximately 3.2 million shares of our common stock from Barclays Bank PLC, in the second quarter of 2017, which were retired and recorded as a \$40.0 million reduction to stockholders' equity. The remaining \$10.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to our stock. The number of shares to be ultimately purchased by us was determined based on the volume weighted average price of the common stock during the terms of the transaction, minus an agreed upon discount between the parties. During the fourth quarter of 2017, the accelerated share repurchase program was completed and we received an additional 0.8 million shares of our common stock as the final settlement of the accelerated share repurchase program. There were no other repurchases of our common stock during 2017.

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On October 26, 2015, we initiated an accelerated share repurchase program with Citibank, N.A. The accelerated share repurchase program is part of the broader share repurchase program previously authorized by our Board on January 21, 2015. Under the accelerated share repurchase program, we pre-paid to Citibank, N.A., the \$100.0 million purchase price for our

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common stock and, in turn, we received an initial delivery of approximately 7.8 million shares of our common stock from Citibank, N.A, in the fourth quarter of 2015, which were retired and recorded as a \$80.0 million reduction to stockholders' equity. The remaining \$20.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to our stock. The number of shares to be ultimately purchased by us was determined based on the volume weighted average price of the common stock during the terms of the transaction, minus an agreed upon discount between the parties. During the second quarter of 2016, the accelerated share repurchase program was completed and we received an additional 0.7 million shares of our common stock as the final settlement of the accelerated share repurchase program. There were no other repurchases of our common stock during 2016.

As of December 31, 2018, there remained an outstanding authorization to repurchase approximately 3.6 million shares of our outstanding common stock under the current share repurchase program.

We record stock repurchases as a reduction to stockholders' equity. We record a portion of the purchase price of the repurchased shares as an increase to accumulated deficit when the price of the shares repurchased exceeds the average original proceeds per share received from the issuance of common stock.

Warrants

In connection with the 2023 Notes, we separately entered into privately negotiated warrant transactions, whereby we sold to the Counterparties warrants (the "Warrants") to acquire, collectively, subject to anti-dilution adjustments, approximately 9.1 million shares of our common stock at an initial strike price of approximately \$23.30 per share, which represents a premium of 60% over the last reported sale price of our common stock of \$14.56 on November 14, 2017. We received aggregate proceeds of approximately \$23.2 million from the sale of the Warrants to the Counterparties. The Warrants are separate transactions and are not part of the 2023 Notes or Convertible Note Hedge Transactions. Holders of the 2023 Notes and Convertible Note Hedge Transactions will not have any rights with respect to the Warrants. See Note 10, "Convertible Notes," of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

Critical Accounting Policies and Estimates

The discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expenses, and related disclosure of contingent assets and liabilities. On an ongoing basis, we evaluate our estimates, including those related to revenue recognition, investments, income taxes, litigation and other contingencies. We base our estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe the following critical accounting policies affect our more significant judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

Overview

We recognize revenue upon transfer of control of promised goods and services in an amount that reflects the consideration we expect to receive in exchange for those goods and services. Unless indicated otherwise below, all of the goods and services are distinct and are accounted for as separate performance obligations.

Where an arrangement includes multiple performance obligations, the transaction price is allocated to these on a relative standalone selling prices basis. We have established standalone selling prices for all of our offerings - specifically, a same pricing methodology is consistently applied to all licensing arrangements; all services offerings are priced within tightly controlled bands and all contracts that include support and maintenance state a renewal rate

or price that is systematically enforced.

Our revenue consists of royalty, product and contract and other revenue. Royalty revenue consists of patent and technology license royalties. Products consist of memory buffer chipsets sold directly and indirectly to module manufacturers and OEMs worldwide through multiple channels, including our direct sales force and distributors. Contract and other revenue consists of

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software license fees, engineering fees associated with integration of our technology solutions into our customers' products and support and maintenance fees.

Royalty Revenue

Our patent and technology licensing arrangements generally range between 1 and 7 years in duration and generally grant the licensee the right to use our entire IP portfolio as it evolves over time. These arrangements do not typically grant the licensee the right to terminate for convenience and where such rights exist, termination is prospective, with no refund of fees already paid by the licensee. There is no interdependency or interrelation between the IP included in the portfolio licensed upon contract inception and any IP subsequently made available to the licensee, and we would be able to fulfill our promises by transferring the portfolio and the additional IP use rights independently. However, the numbers of additions to, and removals from the portfolio (for example when a patent expires and renewal is not granted to us) in any given period have historically been relatively consistent; as such, we do not allocate the transaction price between the rights granted at contract inception and those subsequently granted over time as a function of these additions.

Patent and technology licensing arrangements result in fixed payments received over time, with guaranteed minimum payments on occasion, variable payments calculated based on the licensee's sale or use of the IP, or a mix of fixed and variable payments.

For fixed-fee arrangements (including arrangements that include minimum guaranteed amounts), variable royalty arrangements that we have concluded are fixed in substance and the fixed portion of hybrid fixed/variable arrangements, we recognize revenue upon control over the underlying IP use right transferring to the licensee, net of the effect of significant financing components calculated using customer-specific, risk-adjusted lending rates ranging between 3% and 6%, with the related interest income being recognized over time on an effective rate basis. Where a licensee has the contractual right to terminate a fixed-fee arrangement for convenience without any substantive penalty payable upon such termination, we apply the guidance in the New Revenue Standard to the duration of the contract in which the parties have present enforceable rights and obligations and only recognizes revenue for amounts that are due and payable.

For variable arrangements, we recognize revenue based on an estimate of the licensee's sale or usage of the IP during the period of reference, typically quarterly, with a true-up being recorded when we receive the actual royalty report from the licensee.

Product Revenue

Product revenue is recognized upon shipment of product to customers, net of accruals for estimated sales returns and allowances, and to distributors, net of accruals for price protection and rights of return on products unsold by the distributors. To date, none of these accruals have been significant. We transact with direct customers primarily pursuant to standard purchase orders for delivery of products and generally allow customers to cancel or change purchase orders within limited notice periods prior to the scheduled shipment date.

Contract and Other Revenue

Contract and other revenue consists of software license fees and engineering fees associated with integration of our technology solutions into our customers' solutions (or products) and related support and maintenance.

An initial software arrangement generally consists of a term-based or perpetual license, significant software customization services and support and maintenance services that include post-implementation customer support and the right to unspecified software updates and enhancements on a when and if available basis. We recognize the license and customization services revenue based on man-days incurred during the reporting period as compared to the estimated total man-days necessary for each contract, and the support and maintenance revenue ratably over the term. We recognize license renewal revenue at the beginning of the renewal period. We recognize revenue from professional services purchased in addition to an initial software arrangement on a cumulative catch-up basis if these services are not distinct from the services provided as part of the initial software arrangement, or as a separate contract if these services are distinct.

During the first quarter of 2016, we acquired Smart Card Software Ltd., which included Bell Identification Ltd. (Payment Product Group) and Ecebs Ltd. (Ticketing Products Group), which transact mostly in software and Software-as-a-Service arrangements, respectively.

Our Payment Product Group derives a significant portion of its revenue from heavily customized software in the mobile market, whereby the Payment Product Group's software solution interacts with third-party solutions and other payment platforms to provide the functionality the customer requires. Historically, these third-party solutions have evolved at a rapid

pace, with the Payment Product Group being required to deliver as part of its support and maintenance services the patches and updates needed to maintain the functionality of its own software offering. As the utility of the solution to the end customer erodes very quickly without these updates, these are viewed as critical and the customized software solution and updates are not separately identifiable. As such, these arrangements are treated as a single performance obligation; revenue is deferred until completion of the customization services, and recognized ratably over the committed support and maintenance term, typically ranging from 1 year to 3 years.

Our Ticketing Products Group primarily derives revenue from ticketing services arrangements that systematically consist of a software component, support and maintenance, managed services and hosting services. The software could be hosted by third-party hosting service providers or us. All arrangements entered into subsequent to the acquisition preclude customers from taking possession of the software at any time during the hosting term and we have concluded that should a customer that was under contract as of the acquisition date ever request possession of the software, the Ticketing Products Group would have the ability to charge the customer, and enforce a claim to payment of a substantive fee in exchange for such right, and that the costs of setting up the environment needed to run the software would act as a significant disincentive to the customer taking possession of the software. Based on the above, we concluded that these services are a single performance obligation, with customers simultaneously receiving and consuming the benefits provided by the Ticketing Products Group's performance, and recognize ticketing services revenue ratably over the term, commencing upon completion of setup activities. We recognize setup fees upon completion. While these activities do not transfer a service to the customer, we elected not to defer and amortize these fees over the expected duration of the customer relationship owing to the immateriality of the amounts charged.

Significant Judgments

Historically and with the exceptions noted below, no significant judgment has generally been required in determining the amount and timing of revenue from our contracts with customers.

For our contract and other revenue, revenue is recognized as services are performed on a percentage-of-completion basis, measured using the input method. Due to the nature of the work performed in these arrangements, the estimation of percentage-of-completion is complex and involves significant judgment. The key factor reviewed by us to estimate costs to complete each contract is the estimated man-days necessary to complete the project. If circumstances arise that change the original estimates of extent of progress toward completion, revisions to the estimates are made that may result in increases or decreases in estimated revenues or costs. Revisions are reflected in revenue on a cumulative catch-up basis in the period in which the circumstances that gave rise to the revision become known. We have adequate tools and controls in place, and substantial experience and expertise in timely and accurately tracking man-days incurred in completing customization and other professional services, and quantifying changes in estimates.

Key estimates used in recognizing revenue predominantly consist of the following:

All fixed-fee arrangements result in cash being received after control over the underlying IP use right has transferred to the licensee, and over a period exceeding a year. As such, all these arrangements include a significant financing component. We calculate a customer-specific lending rate using a Daily Treasury Yield Curve Rate that changes depending on the date on which the licensing arrangement was entered into and the term (in years) of the arrangement, and take into consideration a licensee-specific risk profile determined based on a review of the licensee's "Full Company View" Dun & Bradstreet report obtained on the date the licensing arrangement was signed by the parties, with a risk premium being added to the Daily Treasury Yield Curve Rate considering the overall business risk, financing strength and risk indicators, as listed.

We recognize revenue on variable fee licensing arrangements on the basis of estimates. In connection with the adoption of the New Revenue Standard, we have set up specific procedures and controls to ensure timely and accurate quantification of variable royalties, and implemented new systems to enable the preparation of the estimates and reporting of the financial information required by the New Revenue Standard.

Goodwill

Goodwill represents the excess of the purchase price over the fair value of the net tangible and identifiable intangible assets acquired in each business combination. Goodwill is not subject to amortization, but is subject to at least an annual assessment for impairment, applying a fair-value based test. We perform our impairment analysis of goodwill on an annual basis during the fourth quarter of the year unless conditions arise that warrant a more frequent evaluation.

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Goodwill is allocated to the various reporting units which are generally operating segments. The goodwill impairment test compares the fair value of each reporting unit to its carrying value. The fair values of the reporting units are estimated using an income or discounted cash flows approach. Any goodwill impairment will be the amount by which a reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill.

Under the income approach, we measure fair value of the reporting unit based on a projected cash flow method using a discount rate determined by our management which is commensurate with the risk inherent in our current business model. Our discounted cash flow projections are based on our annual financial forecasts developed internally by management for use in managing our business. If the fair value of the reporting unit exceeds its carrying value, goodwill is not impaired and no further testing is required. If the fair value of the reporting unit is less than the carrying value, then the amount of goodwill impairment will be the amount by which the reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill.

As of December 31, 2018, the fair value of the MID reporting unit, with \$66.6 million of goodwill, exceeded the carrying value of its net assets by approximately 17% and the fair value of the RSD reporting unit, with \$140.5 million of goodwill, exceeded the carrying value of its net assets by approximately 72%. Key assumptions used to determine the fair value of the MID and RSD reporting units at December 31, 2018, were the revenue growth rates for the forecast period and terminal year, terminal growth rates and discount rates. Certain estimates used in the income approach involve information for new product lines with limited financial history and developing revenue models which increase the risk of differences between the projected and actual performance. The discount rate of 16% for MID and 16.5% for RSD is based on the reporting units' overall risk profile relative to other guideline companies, market adoption of our technology, the reporting units' respective industry as well as the visibility of future expected cash flows. The terminal growth rate applied to determine fair value for both reporting units was 3%, which was based on historical experience as well as anticipated economic conditions, industry data and long term outlook for the business. These assumptions are inherently uncertain.

Given the current economic environment and the uncertainties regarding the impact on our business, there can be no assurance that the estimates and assumptions made for purposes of our goodwill impairment testing in the fourth quarter of 2018 will prove to be accurate predictions of the future. If our assumptions regarding forecasted revenues or operating margin rates are not achieved, we may be required to record goodwill impairment charges in future periods, whether in connection with the next annual impairment testing or prior to that if any change constitutes a triggering event outside of the period when the annual goodwill impairment test is performed. It is not possible at this time to determine if any such future impairment charge would result or, if it does, whether such charge would be material. We believe that the assumptions and rates used in our impairment test are reasonable. However, they are judgmental, and variations in any of the assumptions or rates could result in materially different calculations of impairment amounts.

Intangible Assets

Intangible assets are comprised of existing technology, customer contracts and contractual relationships, and other definite-lived and indefinite-lived intangible assets. Identifiable intangible assets resulting from the acquisitions of entities accounted for using the purchase method of accounting are estimated by management based on the fair value of assets received. Identifiable definite-lived intangible assets are being amortized over the period of estimated benefit using the straight-line method and estimated useful lives ranging from 1 to 10 years.

We amortize definite-lived assets over their estimated useful lives. We evaluate definite-lived and indefinite-lived assets for impairment whenever events or changes in circumstances indicate the carrying value of an asset may not be recoverable. The carrying value is not recoverable if it exceeds the undiscounted cash flows resulting from the use of the asset and its eventual disposition. Our estimates of future cash flows attributable to our assets require significant judgment based on our historical and anticipated results and are subject to many factors. Factors we consider important which could trigger an impairment review include significant negative industry or economic trends, significant loss of clients, and significant changes in the manner of our use of the acquired assets or the strategy for our overall business.

When we determine that the carrying value of the assets may not be recoverable based upon the existence of one or more of the above indicators of impairment, we measure the potential impairment based on a projected discounted cash flow method using a discount rate determined by our management to be commensurate with the risk inherent in

our current business model. An impairment loss is recognized only if the carrying amount of the asset is not recoverable and exceeds its fair value. Different assumptions and judgments could materially affect the calculation of the fair value of our assets.

Acquired indefinite-lived intangible assets related to our in-process research and development ("IPR&D") are capitalized and subject to impairment testing until completion or abandonment of the projects. Upon successful completion of each project, we make a separate determination of useful life of the acquired indefinite-lived intangible assets and the related amortization is recorded as an expense over the estimated useful life of the specific projects. Indefinite-lived intangible assets are subject to at

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least an annual assessment for impairment, applying a fair-value based test. Under the income approach, we measure fair value of the indefinite-lived intangible assets based on a projected cash flow method using a discount rate determined by our management which is commensurate with the risk inherent in our current business model. Our discounted cash flow projections are based on our annual financial forecasts developed internally by our management for use in managing our business. If the fair value of the indefinite-lived intangible assets exceeds its carrying value, the indefinite-lived intangible assets are not impaired and no further testing is required. If the implied fair value of the indefinite-lived intangible assets is less than the carrying value, the difference is recorded as an impairment loss.

Income Taxes

As part of preparing our consolidated financial statements, we are required to calculate the income tax expense or benefit which relates to the pretax income or loss for the period. In addition, we are required to assess the realization of the deferred tax asset or liability to be included on the consolidated balance sheet as of the reporting dates.

As of December 31, 2018, our consolidated balance sheet included net deferred tax assets, before valuation allowance, of approximately \$159.4 million, which consists of net operating loss carryovers, tax credit carryovers, amortization, employee stock-based compensation expenses and certain liabilities, partially reduced by deferred tax liabilities associated with the ASC 606 adoption. As of December 31, 2018, we have a valuation allowance of \$173.9 million resulting in net deferred tax liabilities of \$14.5 million.

We maintain liabilities for uncertain tax positions within our long-term income taxes payable accounts and as a reduction to existing deferred tax assets to the extent tax attributes are available to offset such liabilities. These liabilities involve judgment and estimation and are monitored by us based on the best information available including changes in tax regulations, the outcome of relevant court cases and other information.

The calculation of our tax liabilities involves uncertainties in the application of complex tax law and regulations in a multitude of jurisdictions. Although ASC 740 Income Taxes, provides further clarification on the accounting for uncertainty in income taxes, significant judgment is required by us. If the ultimate resolution of tax uncertainties is different from what is currently estimated, it could materially affect income tax expense.

Stock-Based Compensation

We maintained stock plans covering a broad range of potential equity grants including stock options, nonvested equity stock and equity stock units and performance based instruments. In addition, we sponsor an Employee Stock Purchase Plan (“ESPP”), whereby eligible employees are entitled to purchase Common Stock semi-annually, by means of limited payroll deductions, at a 15% discount from the fair market value of the Common Stock as of specific dates.

The accounting guidance for share-based payments requires the measurement and recognition of compensation expense in our statement of operations for all share-based payment awards made to our employees, directors and consultants including employee stock options, nonvested equity stock and equity stock units, and employee stock purchase grants. Stock-based compensation expense is measured at grant date, based on the estimated fair value of the award, reduced by an estimate of the annualized rate of expected forfeitures, and is recognized as expense over the employees’ expected requisite service period, generally using the straight-line method. In addition, the accounting guidance for share-based payments requires the benefits of tax deductions in excess of recognized compensation expense to be reported as a financing cash flow, rather than as an operating cash flow as prescribed under previous accounting rules. Our forfeiture rate represents the historical rate at which our stock-based awards were surrendered prior to vesting. The accounting guidance for share-based payments requires forfeitures to be estimated at the time of grant and revised on a cumulative basis, if necessary, in subsequent periods if actual forfeitures differ from those estimates. See Note 12, “Equity Incentive Plans and Stock-Based Compensation,” of Notes to Consolidated Financial Statements of this Form 10-K for more information regarding the valuation of stock-based compensation.

Recent Accounting Pronouncements

See Note 3, “Recent Accounting Pronouncements,” of Notes to Consolidated Financial Statements of this Form 10-K for a full description of recent accounting pronouncements including the respective expected dates of adoption.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to financial market risks, primarily arising from the effect of interest rate fluctuations on our investment portfolio. Interest rate fluctuation may arise from changes in the market’s view of the quality of the security issuer, the overall economic outlook, and the time to maturity of our portfolio. We mitigate this risk by investing only

in high quality, highly

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liquid instruments. Securities with original maturities of one year or less must be rated by two of the three industry standard rating agencies as follows: A1 by Standard & Poor's, P1 by Moody's and/or F-1 by Fitch. Securities with original maturities of greater than one year must be rated by two of the following industry standard rating agencies as follows: AA- by Standard & Poor's, Aa3 by Moody's and/or AA- by Fitch. By corporate investment policy, we limit the amount of exposure to \$15.0 million or 10% of the portfolio, whichever is lower, for any single non-U.S. Government issuer. A single U.S. Agency can represent up to 25% of the portfolio. No more than 20% of the total portfolio may be invested in the securities of an industry sector, with money market fund investments evaluated separately. Our policy requires that at least 10% of the portfolio be in securities with a maturity of 90 days or less. We may make investments in U.S. Treasuries, U.S. Agencies, corporate bonds and municipal bonds and notes with maturities up to 36 months. However, the bias of our investment portfolio is shorter maturities. All investments must be U.S. dollar denominated. Additionally, we have no significant exposure to European sovereign debt.

We invest our cash equivalents and marketable securities in a variety of U.S. dollar financial instruments such as U.S. Treasuries, U.S. Government Agencies, commercial paper and corporate notes. Our policy specifically prohibits trading securities for the sole purposes of realizing trading profits. However, we may liquidate a portion of our portfolio if we experience unforeseen liquidity requirements. In such a case, if the environment has been one of rising interest rates we may experience a realized loss, similarly, if the environment has been one of declining interest rates we may experience a realized gain. As of December 31, 2018, we had an investment portfolio of fixed income marketable securities of \$226.7 million including cash equivalents. If market interest rates were to increase immediately and uniformly by 1.0% from the levels as of December 31, 2018, the fair value of the portfolio would decline by approximately \$0.3 million. Actual results may differ materially from this sensitivity analysis.

The fair value of our convertible notes is subject to interest rate risk, market risk and other factors due to the convertible feature. The fair value of the convertible notes will generally increase as interest rates fall and decrease as interest rates rise. In addition, the fair value of the convertible notes will generally increase as our common stock price increases and will generally decrease as our common stock price declines in value. The interest and market value changes affect the fair value of our convertible notes but do not impact our financial position, cash flows or results of operations due to the fixed nature of the debt obligation.

We invoice the majority of our customers in U.S. dollars. Although the fluctuation of currency exchange rates may impact our customers, and thus indirectly impact us, we do not attempt to hedge this indirect and speculative risk. Our overseas operations consist primarily of international business operations in the Netherlands and the United Kingdom, design centers in Canada, India and Finland and small business development offices in Australia, China, Japan, Korea, Singapore and Taiwan. We monitor our foreign currency exposure; however, as of December 31, 2018, we believe our foreign currency exposure is not material enough to warrant foreign currency hedging.

Item 8. Financial Statements and Supplementary Data

See Item 15 "Exhibits and Financial Statement Schedules" of this Form 10-K for required financial statements and supplementary data.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures designed to ensure that information required to be disclosed in the reports we file or submit pursuant to the Securities and Exchange Act of 1934 as amended ("Exchange Act") is recorded, processed, summarized and reported within the time periods specified in the rules and forms of the Securities and Exchange Commission, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Management, with the participation of the Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of the design and operation of our disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act as of the end of the period covered by this report. Based on this evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of December 31, 2018, our disclosure controls

and procedures were effective.

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Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our internal control over financial reporting is the process designed by, or under the supervision of, our Chief Executive Officer and Chief Financial Officer, and effected by our board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles, and includes those policies and procedures that:

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

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

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2018. In making this assessment, our management used the criteria set forth in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”). Based on the results of this assessment, management has concluded that, as of December 31, 2018, our internal control over financial reporting was effective based on the criteria in Internal Control — Integrated Framework (2013) issued by the COSO.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers, LLP, an independent registered public accounting firm, as stated in their report which appears herein.

Changes in Internal Control Over Financial Reporting

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

Item 9B. Other Information

None.

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PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2019 annual meeting of stockholders 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 Annual Report on Form 10-K. The information under the heading “Our Executive Officers” in Part I, Item 1 of this Annual Report on Form 10-K is also incorporated herein by reference.

We have a Code of Business Conduct and Ethics for all of our directors, officers and employees. Our Code of Business Conduct and Ethics is available on our website at

<http://investor.rambus.com/default.aspx?SectionId=7d08773c-336a-43c5-b0ff-5b190f1901eb&LanguageId=1>. To date, there have been no waivers under our Code of Business Conduct and Ethics. We will post any amendments or waivers, if and when granted, of our Code of Business Conduct and Ethics on our website.

Item 11. Executive Compensation

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2019 annual meeting of stockholders 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 Annual Report on Form 10-K.

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

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2019 annual meeting of stockholders 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 Annual Report on Form 10-K.

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

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2019 annual meeting of stockholders 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 Annual Report on Form 10-K.

Item 14. Principal Accountant Fees and Services

The information responsive to this item is incorporated herein by reference to our Proxy Statement for our 2019 annual meeting of stockholders 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 Annual Report on Form 10-K.

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PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) (1) Financial Statements

The following consolidated financial statements of the Registrant and Report of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm, are included herewith:

	Page
<u>Report of Independent Registered Public Accounting Firm</u>	<u>57</u>
<u>Consolidated Balance Sheets as of December 31, 2018 and 2017</u>	<u>59</u>
<u>Consolidated Statements of Operations for the years ended December 31, 2018, 2017 and 2016</u>	<u>60</u>
<u>Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2018, 2017 and 2016</u>	<u>61</u>
<u>Consolidated Statements of Stockholders' Equity for the years ended December 31, 2018, 2017 and 2016</u>	<u>62</u>
<u>Consolidated Statements of Cash Flows for the years ended December 31, 2018, 2017 and 2016</u>	<u>64</u>
<u>Notes to Consolidated Financial Statements</u>	<u>65</u>
<u>Consolidated Supplementary Financial Data (unaudited)</u>	<u>105</u>

(a) (2) Financial Statement Schedule

All schedules are omitted because they are not applicable or the required information is shown in the Consolidated Financial Statements or the notes thereto.

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Rambus Inc.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Rambus Inc. and its subsidiaries (the “Company”) as of December 31, 2018 and 2017, and the related consolidated statements of operations, comprehensive income (loss), stockholders’ equity and cash flows for each of the three years in the period ended December 31, 2018, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

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

Change in Accounting Principle

As discussed in Note 3 to the consolidated financial statements, the Company changed the manner in which it accounts for revenues from contracts with customers in 2018.

Basis for Opinions

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal

control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to

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permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

/s/ PricewaterhouseCoopers LLP
San Jose, California
February 22, 2019

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

Table of ContentsRAMBUS INC.
CONSOLIDATED BALANCE SHEETS

	December 31,	
	2018	2017
	(In thousands, except shares and per share amounts)	
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 115,924	\$ 225,844
Marketable securities	161,840	103,532
Accounts receivable	50,863	25,326
Unbilled receivables	176,613	566
Inventories	6,772	5,159
Prepays and other current assets	15,738	11,317
Total current assets	527,750	371,744
Intangible assets, net	59,936	91,722
Goodwill	207,178	209,661
Property, plant and equipment, net	57,028	54,303
Deferred tax assets	4,435	159,099
Unbilled receivables, long-term	497,003	—
Other assets	7,825	4,543
Total assets	\$ 1,361,155	\$ 891,072
LIABILITIES & STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 7,392	\$ 9,614
Accrued salaries and benefits	16,938	17,091
Convertible notes, short-term	—	78,451
Deferred revenue	19,374	18,272
Income taxes payable, short-term	16,390	258
Other current liabilities	9,191	9,156
Total current liabilities	69,285	132,842
Convertible notes, long-term	141,934	135,447
Long-term imputed financing obligation	36,297	37,262
Long-term income taxes payable	77,280	3,344
Deferred tax liabilities	18,960	9,830
Other long-term liabilities	5,287	763
Total liabilities	349,043	319,488
Commitments and contingencies (Notes 11 and 17)		
Stockholders' equity:		
Convertible preferred stock, \$.001 par value:		
Authorized: 5,000,000 shares; Issued and outstanding: no shares at December 31, 2018 and December 31, 2017	—	—
Common Stock, \$.001 par value:		
Authorized: 500,000,000 shares; Issued and outstanding: 109,017,708 shares at December 31, 2018 and 109,763,967 shares at December 31, 2017	109	110
Additional paid in capital	1,226,588	1,212,798
Accumulated deficit	(204,294)	(636,227)
Accumulated other comprehensive loss	(10,291)	(5,097)

Total stockholders' equity	1,012,112	571,584
Total liabilities and stockholders' equity	\$1,361,155	\$891,072
See Notes to Consolidated Financial Statements		

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RAMBUS INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended December 31,		
	2018	2017	2016
	(In thousands, except per share amounts)		
Revenue:			
Royalties	\$130,452	\$289,594	\$264,614
Product revenue	38,690	36,509	26,052
Contract and other revenue	62,059	66,993	45,931
Total revenue	231,201	393,096	336,597
Operating costs and expenses:			
Cost of product revenue*	18,299	23,783	21,329
Cost of contract and other revenue	35,402	55,364	45,761
Research and development*	158,339	149,135	129,844
Sales, general and administrative*	103,911	110,940	95,145
Restructuring charges	2,217	—	—
Impairment of in-process research and development intangible asset	—	—	18,300
Change in contingent consideration liability	—	—	(6,845)
Gain from sale of intellectual property	—	(533)	—
Gain from settlement	—	—	(579)
Total operating costs and expenses	318,168	338,689	302,955
Operating income (loss)	(86,967)	54,407	33,642
Interest income and other income (expense), net	32,621	1,384	1,740
Loss on extinguishment of debt	—	(1,082)	—
Interest expense	(16,282)	(13,720)	(12,745)
Interest and other income (expense), net	16,339	(13,418)	(11,005)
Income (loss) before income taxes	(70,628)	40,989	22,637
Provision for income taxes	87,329	63,851	15,817
Net income (loss)	\$(157,957)	\$(22,862)	\$6,820
Net income (loss) per share:			
Basic	\$(1.46)	\$(0.21)	\$0.06
Diluted	\$(1.46)	\$(0.21)	\$0.06
Weighted average shares used in per share calculations:			
Basic	108,450	110,198	110,162
Diluted	108,450	110,198	113,140

* Includes stock-based compensation:

Cost of product revenue	\$8	\$78	\$56
Research and development	\$12,582	\$12,185	\$9,165
Sales, general and administrative	\$9,146	\$15,140	\$11,792

See Notes to Consolidated Financial Statements

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CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Net income (loss)	\$(157,957)	\$(22,862)	\$6,820
Other comprehensive income (loss):			
Foreign currency translation adjustment	(4,447)	7,798	(13,485)
Unrealized gain (loss) on marketable securities, net of tax	(747)	613	(396)
Total comprehensive loss	\$(163,151)	\$(14,451)	\$(7,061)
See Notes to Consolidated Financial Statements			

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RAMBUS INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Common Stock		Additional	Accumulated	Accumulated	Total
	Shares	Amount	Paid-in Capital	Deficit	Other Comprehensive Gain (Loss)	
	(In thousands)					
Balances at December 31, 2015	109,288	\$ 109	\$ 1,130,368	\$ (604,317)	\$ 373	\$ 526,533
Net income	—	—	—	6,820	—	6,820
Foreign currency translation adjustment	—	—	—	—	(13,485)	(13,485)
Unrealized loss on marketable securities, net of tax	—	—	—	—	(396)	(396)
Issuance of common stock upon exercise of options, equity stock and employee stock purchase plan	2,502	3	12,294	—	—	12,297
Repurchase and retirement of common stock under repurchase plan	(736)	(1)	17,555	(17,554)	—	—
Stock-based compensation	—	—	21,013	—	—	21,013
Balances at December 31, 2016	111,054	111	1,181,230	(615,051)	(13,508)	552,782
Net loss	—	—	—	(22,862)	—	(22,862)
Foreign currency translation adjustment	—	—	—	—	7,798	7,798
Unrealized gain on marketable securities, net of tax	—	—	—	—	613	613
Issuance of common stock upon exercise of options, equity stock and employee stock purchase plan	2,727	3	10,730	—	—	10,733
Repurchase and retirement of common stock under repurchase plan	(4,017)	(4)	(13,477)	(36,557)	—	(50,038)
Stock-based compensation	—	—	27,403	—	—	27,403
Equity component of 1.375% convertible notes, net	—	—	33,913	—	—	33,913
Purchase of convertible note hedges	—	—	(33,523)	—	—	(33,523)
Issuance of warrants	—	—	23,173	—	—	23,173
Repurchase of 1.125% convertible notes	—	—	(16,651)	—	—	(16,651)
Cumulative effect adjustment from adoption of ASU 2016-09	—	—	—	38,243	—	38,243
Balances at December 31, 2017	109,764	110	1,212,798	(636,227)	(5,097)	571,584
Net loss	—	—	—	(157,957)	—	(157,957)
Foreign currency translation adjustment	—	—	—	—	(4,447)	(4,447)
Unrealized loss on marketable securities, net of tax	—	—	—	—	(747)	(747)
Issuance of common stock upon exercise of options, equity stock and employee stock purchase plan	2,616	3	4,627	—	—	4,630
Repurchase and retirement of common stock under repurchase plan	(3,786)	(4)	(12,573)	(37,456)	—	(50,033)
Stock-based compensation	—	—	21,736	—	—	21,736
Issuance of common stock in connection with the maturity of the 2018 Notes related to the	424	—	—	—	—	—

settlement of the in-the-money conversion
feature of the 2018 Notes

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Cumulative effect adjustment from adoption of ASU 2016-01	—	—	—	1,058	—	1,058
Cumulative effect adjustment from the adoption of ASC 606	—	—	—	626,288	—	626,288
Balances at December 31, 2018	109,018	\$ 109	\$ 1,226,588	\$(204,294)	\$(10,291)	\$ 1,012,112
See Notes to Consolidated Financial Statements						

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RAMBUS INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Cash flows from operating activities:			
Net income (loss)	\$(157,957)	\$(22,862)	\$6,820
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Stock-based compensation	21,736	27,403	21,013
Depreciation	10,745	13,275	12,965
Amortization of intangible assets	29,341	41,962	37,138
Non-cash interest expense and amortization of convertible debt issuance costs	9,243	7,578	6,749
Loss on extinguishment of debt	—	1,082	—
Impairment of in-process research and development intangible asset	—	—	18,300
Change in contingent consideration liability	—	—	(6,845)
Deferred tax (benefit) provision	79,954	39,535	(7,116)
Excess tax benefits from stock-based compensation	—	—	(1,196)
Non-cash restructuring	670	—	—
Gain from sale of assets held for sale	(1,266)	—	—
Gain from sale of marketable equity security	(291)	—	—
Loss on equity investment	67	—	—
Loss from sale of property and property, plant and equipment	395	227	—
Effect of exchange rate on assumed cash liability from acquisition	—	—	(1,558)
Change in operating assets and liabilities, net of effects of acquisitions:			
Accounts receivable	(24,933)	(1,110)	5,797
Unbilled receivables	145,164	—	—
Prepaid expenses and other assets	(4,084)	4,354	(6,205)
Inventories	(1,856)	473	1,748
Accounts payable	(2,268)	(651)	2,373
Accrued salaries and benefits and other accrued liabilities	(3,221)	4,703	(1,519)
Income taxes payable	(14,550)	861	(175)
Deferred revenue	228	607	7,313
Net cash provided by operating activities	87,117	117,437	95,602
Cash flows from investing activities:			
Purchases of property, plant and equipment	(10,762)	(9,385)	(8,556)
Acquisition of intangible assets	(350)	(120)	—
Purchases of marketable securities	(282,117)	(102,497)	(54,869)
Maturities of marketable securities	223,079	32,048	110,081
Proceeds from sale of marketable securities	—	4,450	50,546
Proceeds from sale of property and property, plant and equipment	10	33	113
Proceeds from sale of assets held for sale	3,754	—	—
Proceeds from sale of equity security	1,350	—	—
Investment in privately-held company	(3,000)	—	—
Acquisition of businesses, net of cash acquired	—	—	(202,523)
Net cash used in investing activities	(68,036)	(75,471)	(105,208)
Cash flows from financing activities:			
Proceeds from issuance of 1.375% convertible notes	—	172,500	—
Issuance costs related to issuance of 1.375% convertible notes	—	(3,277)	—

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Payments for convertible note hedges	—	(33,523)	—
Proceeds from issuance of warrants	—	23,173	—
Repayment of 1.125% convertible notes	(81,207)	(72,257)	—
Proceeds received from issuance of common stock under employee stock plans	11,402	15,826	15,436
Principal payments against financing lease obligation	(1,080)	(860)	(661)
Payment of additional purchase consideration from acquisition	—	—	(10,206)
Repurchase and retirement of common stock, including prepayment under accelerated share repurchase program	(50,033)	(50,038)	—
Excess tax benefits from stock-based compensation	—	—	1,196
Payments of taxes on restricted stock units	(6,766)	(5,099)	(3,064)
Net cash provided by (used in) financing activities	(127,684)	46,445	2,701
Effect of exchange rate changes on cash and cash equivalents	(989)	2,139	(1,565)
Net increase (decrease) in cash and cash equivalents	(109,592)	90,550	(8,470)
Cash and cash equivalents at beginning of year	225,844	135,294	143,764
Cash and cash equivalents at end of year	\$116,252	\$225,844	\$135,294
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	\$3,044	\$1,553	\$1,553
Income taxes, net of refunds	\$23,581	\$22,733	\$26,787
Non-cash investing and financing activities:			
Property, plant and equipment received and accrued in accounts payable and other accrued liabilities	\$8,225	\$1,092	\$576
See Notes to Consolidated Financial Statements			

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RAMBUS INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Formation and Business of the Company

Rambus Inc. (the “Company” or “Rambus”) was incorporated in California in March 1990 and reincorporated in Delaware in March 1997. In addition to licensing, the Company is creating new business opportunities through offering products and services where its goal is to perpetuate strong company operating performance and long-term stockholder value. The Company generates revenue by licensing its inventions and solutions, selling its semiconductor products and providing services to market-leading companies.

Building upon the foundation of technologies for memory, SerDes and other chip interfaces, the Company has expanded its portfolio of inventions and solutions to address chip and system security, as well as device provisioning and key management. The Company intends to continue its growth in leading-edge, high-growth markets, consistent with its mission to create value through its innovations and to make those technologies available through the shipment of products, the delivery of services, and licensing business models. Key to its 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 its fields of focus.

2. Summary of Significant Accounting Policies

Financial Statement Presentation

The accompanying consolidated financial statements include the accounts of Rambus and its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in the accompanying consolidated financial statements. Investments in entities with more than 20% ownership by Rambus and in which Rambus has the ability to significantly influence the operations of the investee (but not control) are accounted for using the equity method and are included in other assets.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

Reclassifications

Certain prior year balances were reclassified to conform to the current year’s presentation. None of these reclassifications had an impact on reported net income or cash flows for any of the periods presented.

Revenue Recognition

Overview

The Company recognizes revenue upon transfer of control of promised goods and services in an amount that reflects the consideration it expects to receive in exchange for those goods and services. Unless indicated otherwise below, all of the goods and services are distinct and are accounted for as separate performance obligations.

Where an arrangement includes multiple performance obligations, the transaction price is allocated to these on a relative standalone selling prices basis. The Company has established standalone selling prices for all of its offerings - specifically, a same pricing methodology is consistently applied to all licensing arrangements; all services offerings are priced within tightly controlled bands and all contracts that include support and maintenance state a renewal rate or price that is systematically enforced.

Rambus’ revenue consists of royalty, product and contract and other revenue. Royalty revenue consists of patent and technology license royalties. Products consist of memory buffer chipsets sold directly and indirectly to module manufacturers and OEMs worldwide through multiple channels, including our direct sales force and distributors. Contract and other revenue consists of software license fees, engineering fees associated with integration of Rambus’ technology solutions into its customers’ products and support and maintenance fees.

Royalty Revenue

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Rambus' patent and technology licensing arrangements generally range between 1 and 7 years in duration and generally grant the licensee the right to use the Company's entire IP portfolio as it evolves over time. These arrangements do not typically grant the licensee the right to terminate for convenience and where such rights exist, termination is prospective, with no refund of fees already paid by the licensee. There is no interdependency or interrelation between the IP included in the portfolio licensed upon contract inception and any IP subsequently made available to the licensee, and the Company would be able to fulfill its promises by transferring the portfolio and the additional IP use rights independently. However, the numbers of additions to, and removals from the portfolio (for example when a patent expires and renewal is not granted to the Company) in any given period have historically been relatively consistent; as such, the Company does not allocate the transaction price between the rights granted at contract inception and those subsequently granted over time as a function of these additions.

Patent and technology licensing arrangements result in fixed payments received over time, with guaranteed minimum payments on occasion, variable payments calculated based on the licensee's sale or use of the IP, or a mix of fixed and variable payments.

For fixed-fee arrangements (including arrangements that include minimum guaranteed amounts), variable royalty arrangements that the Company has concluded are fixed in substance and the fixed portion of hybrid fixed/variable arrangements, the Company recognizes revenue upon control over the underlying IP use right transferring to the licensee, net of the effect of significant financing components calculated using customer-specific, risk-adjusted lending rates ranging between 3% and 6%, with the related interest income being recognized over time on an effective rate basis. Where a licensee has the contractual right to terminate a fixed-fee arrangement for convenience without any substantive penalty payable upon such termination, the Company applies the guidance in the New Revenue Standard to the duration of the contract in which the parties have present enforceable rights and obligations and only recognizes revenue for amounts that are due and payable.

For variable arrangements, the Company recognizes revenue based on an estimate of the licensee's sale or usage of the IP during the period of reference, typically quarterly, with a true-up being recorded when the Company receives the actual royalty report from the licensee.

Product Revenue

Product revenue is recognized upon shipment of product to customers, net of accruals for estimated sales returns and allowances, and to distributors, net of accruals for price protection and rights of return on products unsold by the distributors. To date, none of these accruals have been significant. The Company transacts with direct customers primarily pursuant to standard purchase orders for delivery of products and generally allows customers to cancel or change purchase orders within limited notice periods prior to the scheduled shipment date.

Contract and Other Revenue

Contract and other revenue consists of software license fees and engineering fees associated with integration of Rambus' technology solutions into its customers' solutions (or products) and related support and maintenance. An initial software arrangement generally consists of a term-based or perpetual license, significant software customization services and support and maintenance services that include post-implementation customer support and the right to unspecified software updates and enhancements on a when and if available basis. The Company recognizes the license and customization services revenue based on man-days incurred during the reporting period as compared to the estimated total man-days necessary for each contract, and the support and maintenance revenue ratably over the term. The Company recognizes license renewal revenue at the beginning of the renewal period. The Company recognizes revenue from professional services purchased in addition to an initial software arrangement on a cumulative catch-up basis if these services are not distinct from the services provided as part of the initial software arrangement, or as a separate contract if these services are distinct.

During the first quarter of 2016, the Company acquired Smart Card Software Ltd., which included Bell Identification Ltd. (Payment Product Group) and Ecebs Ltd. (Ticketing Products Group), which transact mostly in software and

Software-as-a-Service arrangements, respectively.

The Company's Payment Product Group derives a significant portion of its revenue from heavily customized software in the mobile market, whereby the Payment Product Group's software solution interacts with third-party solutions and other payment platforms to provide the functionality the customer requires. Historically, these third-party solutions have evolved at a rapid pace, with the Payment Product Group being required to deliver as part of its support and maintenance services the patches and updates needed to maintain the functionality of its own software offering. As the utility of the solution to the end customer

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

erodes very quickly without these updates, these are viewed as critical and the customized software solution and updates are not separately identifiable. As such, these arrangements are treated as a single performance obligation; revenue is deferred until completion of the customization services, and recognized ratably over the committed support and maintenance term, typically ranging from 1 year to 3 years.

The Company's Ticketing Products Group primarily derives revenue from ticketing services arrangements that systematically consist of a software component, support and maintenance, managed services and hosting services. The software could be hosted by third-party hosting service providers or the Company. All arrangements entered into subsequent to the acquisition preclude customers from taking possession of the software at any time during the hosting term and the Company has concluded that should a customer that was under contract as of the acquisition date ever request possession of the software, the Ticketing Products Group would have the ability to charge the customer, and enforce a claim to payment of a substantive fee in exchange for such right, and that the costs of setting up the environment needed to run the software would act as a significant disincentive to the customer taking possession of the software. Based on the above, the Company concluded that these services are a single performance obligation, with customers simultaneously receiving and consuming the benefits provided by the Ticketing Products Group's performance, and recognize ticketing services revenue ratably over the term, commencing upon completion of setup activities. The Company recognizes setup fees upon completion. While these activities do not transfer a service to the customer, the Company elected not to defer and amortize these fees over the expected duration of the customer relationship owing to the immateriality of the amounts charged.

Significant Judgments

Historically and with the exceptions noted below, no significant judgment has generally been required in determining the amount and timing of revenue from the Company's contracts with customers.

For the Company's contract and other revenue, revenue is recognized as services are performed on a percentage-of-completion basis, measured using the input method. Due to the nature of the work performed in these arrangements, the estimation of percentage-of-completion is complex and involves significant judgment. The key factor reviewed by the Company to estimate costs to complete each contract is the estimated man-days necessary to complete the project. If circumstances arise that change the original estimates of extent of progress toward completion, revisions to the estimates are made that may result in increases or decreases in estimated revenues or costs. Revisions are reflected in revenue on a cumulative catch-up basis in the period in which the circumstances that gave rise to the revision become known. The Company has adequate tools and controls in place, and substantial experience and expertise in timely and accurately tracking man-days incurred in completing customization and other professional services, and quantifying changes in estimates.

Key estimates used in recognizing revenue predominantly consist of the following:

All fixed-fee arrangements result in cash being received after control over the underlying IP use right has transferred to the licensee, and over a period exceeding a year. As such, all these arrangements include a significant financing component. The Company calculates a customer-specific lending rate using a Daily Treasury Yield Curve Rate that changes depending on the date on which the licensing arrangement was entered into and the term (in years) of the arrangement, and takes into consideration a licensee-specific risk profile determined based on a review of the licensee's "Full Company View" Dun & Bradstreet report obtained on the date the licensing arrangement was signed by the parties, with a risk premium being added to the Daily Treasury Yield Curve Rate considering the overall business risk, financing strength and risk indicators, as listed.

The Company recognizes revenue on variable fee licensing arrangements on the basis of estimates. In connection with the adoption of the New Revenue Standard, the Company has set up specific procedures and controls to ensure timely and accurate quantification of variable royalties, and implemented new systems to enable the preparation of the estimates and reporting of the financial information required by the New Revenue Standard.

Contract Balances

Timing of revenue recognition may differ from the timing of invoicing to the Company's customers. The Company records contract assets when revenue is recognized prior to invoicing, and a contract liability when revenue is recognized subsequent to invoicing.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The contract assets are primarily related to the Company's fixed fee IP licensing arrangements and rights to consideration for performance obligations delivered but not billed as of December 31, 2018. The contract assets are transferred to receivables when the billing occurs.

The Company's contract balances were as follows:

	As of	
(In thousands)	December 31, 2018	January 1, 2018
Unbilled receivables	\$673,616	\$818,371
Deferred revenue	19,566	20,737

During the year ended December 31, 2018, the Company recognized \$20.5 million of revenue that was included in the deferred revenue balance, as adjusted for ASC 606, as of January 1, 2018.

Revenue allocated to remaining performance obligations represents the transaction price allocated to the performance obligations that are unsatisfied, or partially unsatisfied, which includes unearned revenue and amounts that will be invoiced and recognized as revenue in future periods. Contracted but unsatisfied performance obligations were approximately \$34.0 million as of December 31, 2018, which the Company primarily expects to recognize over the next 2 years.

Cost of Revenue

Cost of revenue includes cost of professional services, materials, including cost of wafers processed by third-party foundries, cost associated with packaging and assembly, test and shipping, cost of personnel, including stock-based compensation, and equipment associated with manufacturing support, logistics and quality assurance, warranty cost, amortization of developed technology, amortization of step-up values of inventory from acquisitions, write down of inventories, amortization of production mask costs, overhead and an allocated portion of occupancy costs.

Goodwill

Goodwill represents the excess of the purchase price over the fair value of the net tangible and identifiable intangible assets acquired in each business combination. Goodwill is not subject to amortization, but is subject to at least an annual assessment for impairment, applying a fair-value based test. The Company performs its impairment analysis of goodwill on an annual basis during the fourth quarter of the year unless conditions arise that warrant a more frequent evaluation.

Goodwill is allocated to the various reporting units which are generally operating segments. The goodwill impairment test compares the fair value of each reporting unit to its carrying value. The fair values of the reporting units are estimated using an income or discounted cash flows approach. Any goodwill impairment will be the amount by which a reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill.

Under the income approach, the Company measures fair value of the reporting unit based on a projected cash flow method using a discount rate determined by its management which is commensurate with the risk inherent in its current business model. The Company's discounted cash flow projections are based on its annual financial forecasts developed internally by management for use in managing its business. If the fair value of the reporting unit exceeds its carrying value, goodwill is not impaired and no further testing is required. If the fair value of the reporting unit is less than the carrying value, then the amount of goodwill impairment will be the amount by which the reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill.

The Company performed its annual goodwill impairment analysis as of December 31, 2018 and determined that the fair value of the reporting units with goodwill exceeded their carrying values.

Intangible Assets

Intangible assets are comprised of existing technology, customer contracts and contractual relationships, and other definite-lived and indefinite-lived intangible assets. Identifiable intangible assets resulting from the acquisitions of entities accounted for using the purchase method of accounting are estimated by management based on the fair value of assets received. Identifiable definite-lived intangible assets are being amortized over the period of estimated benefit

using the straight-line method and estimated useful lives ranging from 1 to 10 years.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Acquired indefinite-lived intangible assets related to the Company's in-process research and development ("IPR&D") are capitalized and subject to impairment testing until completion or abandonment of the projects. Upon successful completion of each project, the Company makes a separate determination of the useful life of the acquired indefinite-lived intangible assets and the related amortization is recorded as an expense over the estimated useful life of the specific projects. Indefinite-lived intangible assets are subject to at least an annual assessment for impairment, applying a fair-value based test. Under the income approach, the Company measures fair value of the indefinite-lived intangible assets based on a projected cash flow method using a discount rate determined by its management which is commensurate with the risk inherent in its current business model. The Company's discounted cash flow projections are based on its annual financial forecasts developed internally by management for use in managing its business. If the fair value of the indefinite-lived intangible assets exceeds its carrying value, the indefinite-lived intangible assets are not impaired and no further testing is required. If the implied fair value of the indefinite-lived intangible assets is less than the carrying value, the difference is recorded as an impairment loss.

Inventories

Inventories are stated at the lower of cost or net realizable value. Cost is computed using standard cost, which approximates actual cost, on a first-in, first-out basis. Inventories are reduced for write downs based on periodic reviews for evidence of slow-moving or obsolete parts. The write-down is based on comparison between inventory on hand and estimated future sales for each specific product. Once written down, inventory write downs are not reversed until the inventory is sold or scrapped. Inventory write downs are also established when conditions indicate that the net realizable value is less than cost due to physical deterioration, obsolescence, changes in price level or other causes.

Property, Plant and Equipment

Property, plant and equipment include computer equipment, computer software, machinery, leasehold improvements, furniture and fixtures and buildings. Computer equipment, computer software, machinery, and furniture and fixtures are stated at cost and generally depreciated on a straight-line basis over an estimated useful life of 3, 3 to 5, 2 or 7, and 3 years, respectively. In past years, the Company undertook a series of structural improvements to ready the Sunnyvale and Brecksville facilities for its use. The Company concluded that its requirement to fund construction costs and responsibility for cost overruns resulted in the Company being considered the owner of the buildings during the construction period for accounting purposes. Upon completion of construction, the Company concluded that it retained sufficient continuing involvement to preclude de-recognition of the buildings under the FASB's authoritative guidance applicable to sale leaseback for real estate. As such, the Company continues to account for the buildings as owned real estate and to record an imputed financing obligation for its obligation to the legal owners. The buildings are being depreciated on a straight-line basis over an estimated useful life of approximately 39 years. See Note 9, "Balance Sheet Details," and Note 11, "Commitments and Contingencies," for additional details. Leasehold improvements are amortized on a straight-line basis over the shorter of their estimated useful lives or the initial terms of the leases. Upon disposal, assets and related accumulated depreciation are removed from the accounts and the related gain or loss is included in the results from operations.

Definite-Lived and Indefinite-Lived Asset Impairment

The Company evaluates definite-lived and indefinite-lived assets (including property, plant and equipment and intangible assets) for impairment whenever events or changes in circumstances indicate the carrying value of an asset group may not be recoverable. The carrying value is not recoverable if it exceeds the undiscounted cash flows resulting from the use of the asset group and its eventual disposition. The Company's estimates of future cash flows attributable to its asset groups require significant judgment based on its historical and anticipated results and are subject to many factors. Factors that the Company considers important which could trigger an impairment review include significant negative industry or economic trends, significant loss of clients, and significant changes in the manner of its use of the acquired assets or the strategy for its overall business.

When the Company determines that the carrying value of the asset groups may not be recoverable based upon the existence of one or more of the above indicators of impairment, the Company measures the potential impairment based on a projected discounted cash flow method using a discount rate determined by the Company to be

commensurate with the risk inherent in the Company's current business model. An impairment loss is recognized only if the carrying amount of the asset group is not recoverable and exceeds its fair value. The impairment charge is recorded to reduce the pre-impairment carrying amount of the assets based on the relative carrying amount of those assets, though not to reduce the carrying amount of an asset below its fair value. Different assumptions and judgments could materially affect the calculation of the fair value of the assets. During 2018 and 2017, the Company did not recognize any impairment of its definite-lived and indefinite-lived assets. During 2016, the Company recognized an impairment of its IPR&D intangible asset of \$18.3 million.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Income Taxes

Income taxes are accounted for using an asset and liability approach, which requires the recognition of deferred tax assets and liabilities for expected future tax events that have been recognized differently in Rambus' consolidated financial statements and tax returns. The measurement of current and deferred tax assets and liabilities is based on provisions of the enacted tax law and the effects of future changes in tax laws or rates are not anticipated. A valuation allowance is established when necessary to reduce deferred tax assets to amounts expected to be realized based on available evidence.

In addition, the calculation of the Company's tax liabilities involves dealing with uncertainties in the application of complex tax regulations. As a result, the Company reports a liability for unrecognized tax benefits resulting from uncertain tax positions taken or expected to be taken in its tax return. The Company considers many factors when evaluating and estimating its tax positions and tax benefits, which may require periodic adjustments and which may not accurately anticipate actual outcomes.

Stock-Based Compensation and Equity Incentive Plans

The Company maintained stock plans covering a broad range of equity grants including stock options, nonvested equity stock and equity stock units and performance based instruments. In addition, the Company sponsors an Employee Stock Purchase Plan ("ESPP"), whereby eligible employees are entitled to purchase Common Stock semi-annually, by means of limited payroll deductions, at a 15% discount from the fair market value of the Common Stock as of specific dates.

The Company determines compensation expense associated with restricted stock units based on the fair value of its common stock on the date of grant. The Company determines compensation expense associated with stock options based on the estimated grant date fair value method using the Black-Scholes Merton valuation model. The Company generally recognizes compensation expense using a straight-line amortization method over the respective vesting period for awards that are ultimately expected to vest. Stock-based compensation expense for 2018, 2017 and 2016 has been reduced for estimated forfeitures. When estimating forfeitures, the Company considers voluntary termination behaviors as well as trends of actual option forfeitures.

Cash and Cash Equivalents

Cash equivalents are highly liquid investments with original maturity of three months or less at the date of purchase. The Company maintains its cash balances with high quality financial institutions. Cash equivalents are invested in highly-rated and highly-liquid money market securities and certain U.S. government sponsored obligations.

Marketable Securities

Available-for-sale securities are carried at fair value, based on quoted market prices, with the unrealized gains or losses reported, net of tax, in stockholders' equity as part of accumulated other comprehensive income (loss). The amortized cost of debt securities is adjusted for amortization of premiums and accretion of discounts to maturity, both of which are included in interest and other income, net. Realized gains and losses are recorded on the specific identification method and are included in interest and other income, net. The Company reviews its investments in marketable securities for possible other than temporary impairments on a regular basis. If any loss on investment is believed to be a credit loss, a charge will be recognized in operations. In evaluating whether a credit loss on a debt security has occurred, the Company considers the following factors: 1) the Company's intent to sell the security, 2) if the Company intends to hold the security, whether or not it is more likely than not that the Company will be required to sell the security before recovery of the security's amortized cost basis and 3) even if the Company intends to hold the security, whether or not the Company expects the security to recover the entire amortized cost basis. Due to the high credit quality and short term nature of the Company's investments, there have been no material credit losses recorded to date. The classification of funds between short-term and long-term is based on whether the securities are

available for use in operations or other purposes.

Fair Value of Financial Instruments

The carrying value of cash equivalents, accounts receivable and accounts payable approximate their fair values due to their relatively short maturities as of December 31, 2018 and 2017. Marketable securities are comprised of available-for-sale securities that are reported at fair value with the related unrealized gains and losses included in accumulated other comprehensive income (loss), a component of stockholders' equity, net of tax. Fair value of the marketable securities is determined based on quoted market prices. The fair value of the Company's convertible notes fluctuates with interest rates and with the market price of the common stock, but does not affect the carrying value of the debt on the balance sheet.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Research and Development

Costs incurred in research and development, which include engineering expenses, such as salaries and related benefits, stock-based compensation, depreciation, professional services and overhead expenses related to the general development of Rambus' products, are expensed as incurred. Software development costs are capitalized beginning when a product's technological feasibility has been established and ending when a product is available for general release to customers. Rambus has not capitalized any software development costs since the period between establishing technological feasibility and general customer release is relatively short and as such, these costs have not been material.

Computation of Earnings (Loss) Per Share

Basic earnings (loss) per share is calculated by dividing the net income (loss) by the weighted average number of common shares outstanding during the period. Diluted earnings (loss) per share is calculated by dividing the earnings (loss) by the weighted average number of common shares and potentially dilutive securities outstanding during the period. Potentially dilutive common shares consist of incremental common shares issuable upon exercise of stock options, employee stock purchases, restricted stock and restricted stock units, and shares issuable upon the conversion of convertible notes. The dilutive effect of outstanding shares is reflected in diluted earnings per share by application of the treasury stock method. This method includes consideration of the amounts to be paid by the employees, the amount of excess tax benefits that would be recognized in equity if the instrument was exercised and the amount of unrecognized stock-based compensation related to future services. No potential dilutive common shares are included in the computation of any diluted per share amount when a net loss is reported.

Comprehensive Income (Loss)

Comprehensive income (loss) is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources, including foreign currency translation adjustments and unrealized gains and losses on marketable securities. Other comprehensive income (loss), net of tax, is presented in the consolidated statements of comprehensive income (loss).

Credit Concentration

As of December 31, 2018 and 2017, the Company's cash, cash equivalents and marketable securities were invested with various financial institutions in the form of corporate notes, bonds and commercial paper, money market funds, U.S. Treasuries, U.S. Government Agencies, and municipal bonds and notes. The Company's exposure to market risk for changes in interest rates relates primarily to its investment portfolio. The Company places its investments with high credit issuers and, by investment policy, attempts to limit the amount of credit exposure to any one issuer. As stated in the Company's investment policy, it will ensure the safety and preservation of the Company's invested funds by limiting default risk and market risk. The Company has no investments denominated in foreign country currencies and therefore is not subject to foreign exchange risk from these assets.

The Company mitigates default risk by investing in high credit quality securities and by positioning its portfolio to respond appropriately to a significant reduction in a credit rating of any investment issuer or guarantor. The portfolio includes only marketable securities with active secondary or resale markets to enable portfolio liquidity.

The Company's note hedge transactions, entered into in connection with the 1.375% convertible senior notes due 2023 (the "2023 Notes"), expose the Company to credit risk to the extent that its counterparties may be unable to meet the terms of the transactions. The Company mitigates this risk by limiting its counterparties to major financial institutions. See Note 10, "Convertible Notes" for further details.

The Company's accounts receivable are derived from revenue earned from customers located in the U.S. and internationally. See Note 6, "Segments and Major Customers" for further details.

Foreign Currency Translation and Re-measurement

The Company translates the assets and liabilities of its non-U.S. dollar functional currency subsidiaries into U.S. dollars using exchange rates in effect at the end of each period. Revenue and expenses for these subsidiaries are translated using rates that approximate those in effect during the period. Gains and losses from these translations are recognized in foreign currency translation included in Accumulated Other Comprehensive Gain (Loss) in the

consolidated statements of stockholders' equity. The Company's subsidiaries that use the U.S. dollar as their functional currency re-measure monetary assets and liabilities at exchange rates in effect at the end of each period, and inventories, property and non-monetary assets and liabilities at historical

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

rates. Additionally, foreign currency transaction gains and losses are included in interest income and other (income) expense, net, in the consolidated statements of operations and were not material in the periods presented.

Business Combinations

The Company accounts for acquisitions of businesses using the purchase method of accounting, which requires the Company to recognize separately from goodwill the assets acquired and the liabilities assumed at their acquisition date fair values. While the Company uses its best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date as well as contingent consideration, where applicable, the estimates are inherently uncertain and subject to refinement. As a result, during the measurement period, which may be up to one year from the acquisition date, the Company may record adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the consolidated statements of operations.

Accounting for business combinations requires management to make significant estimates and assumptions, especially at the acquisition date including the Company's estimates for intangible assets, contractual obligations assumed and pre-acquisition contingencies where applicable. Although, the Company believes the assumptions and estimates made in the past have been reasonable and appropriate, they are based in part on historical experience and information obtained from the management of the acquired companies and are inherently uncertain. Critical estimates in valuing certain of the intangible assets the Company acquired include future expected cash flows from product sales, customer contracts and acquired technologies, expected costs to develop IPR&D into commercially viable products and estimated cash flows from the projects when completed and discount rates. Unanticipated events and circumstances may occur that may affect the accuracy or validity of such assumptions, estimates or actual results.

Litigation

Rambus may be involved in certain legal proceedings. Based upon consultation with outside counsel handling its defense in these matters and an analysis of potential results, if Rambus believes that a loss arising from such matters is probable and can be reasonably estimated, Rambus records the estimated liability in its consolidated financial statements. If only a range of estimated losses can be determined, Rambus records an amount within the range that, in its judgment, reflects the most likely outcome; if none of the estimates within that range is a better estimate than any other amount, Rambus records the low end of the range. Any such accrual would be charged to expense in the appropriate period. Rambus recognizes litigation expenses in the period in which the litigation services were provided.

3. Recent Accounting Pronouncements**Recent Accounting Pronouncements Adopted**

In February 2018, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) No. 2018-02, "Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income". The amendments in this ASU allow entities to reclassify from AOCI to retained earnings "stranded" tax effects resulting from passage of the Tax Cuts and Jobs Act ("the Tax Act") on December 22, 2017. An entity that elects to reclassify these amounts must reclassify stranded tax effects related to the change in federal tax rate for all items accounted for in other comprehensive income (e.g., employee benefits, cumulative translation adjustments). Entities may also elect to reclassify other stranded tax effects that relate to the Tax Act but do not directly relate to the change in the federal tax rate (e.g., state taxes). However, because the amendments only relate to the reclassification of the income tax effects of the Tax Act, the underlying guidance requiring the effect of a change in tax laws or rates to be included in income from operations is not affected. Upon adoption of this ASU, entities are required to disclose their policy for releasing the income tax effects from AOCI. ASU 2018-02 is effective for annual periods beginning after December 15, 2018, and interim periods within those fiscal years. Early adoption is permitted. The amendments in this ASU may be applied retrospectively to each period in which the effect of the Tax Act is recognized or an entity may elect to apply the amendments in the period of adoption. The Company early adopted this ASU in the first quarter of 2018. The adoption of this ASU did not have a material impact on the Company's consolidated financial statements.

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In May 2017, the FASB issued ASU No. 2017-09, "Compensation—Stock Compensation (Topic 718): Scope of Modification Accounting," which amends the scope of modification accounting for share-based payment arrangements. Specifically, an entity would not apply modification accounting if the fair value, vesting conditions, and classification of the awards are the same immediately before and after the modification. This ASU is effective for interim and annual reporting

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periods beginning after December 15, 2017. The Company adopted this ASU on January 1, 2018. The adoption of this ASU did not have a material impact on the Company's consolidated financial statements.

In January 2017, the FASB issued ASU No. 2017-04, "Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment," which removes Step 2 of the goodwill impairment test. A goodwill impairment will now be the amount by which a reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill. This ASU is effective for interim and annual reporting periods beginning after December 15, 2019. Early adoption is permitted, including adoption in an interim period. The Company adopted this ASU on December 31, 2018. The adoption of this ASU did not have a material impact on the Company's consolidated financial statements. In January 2017, the FASB issued ASU No. 2017-01, "Business Combinations (Topic 805): Clarifying the Definition of a Business." The amendment seeks to clarify the definition of a business with the objective of adding guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. The definition of a business affects many areas of accounting including acquisitions, disposals, goodwill and consolidation. This ASU is effective for interim and annual reporting periods beginning after December 15, 2017, including interim periods within those periods. The amendments should be applied prospectively on or after the effective dates. The Company adopted this ASU on January 1, 2018. The adoption of this ASU did not have a material impact on the Company's consolidated financial statements.

In January 2016, the FASB issued ASU No. 2016-01, which amends certain aspects of the recognition, measurement, presentation and disclosure of certain financial instruments, including equity investments and liabilities measured at fair value under the fair value option. The main provisions include a requirement that all investments in equity securities be measured at fair value through earnings, with certain exceptions, and a requirement to present separately in other comprehensive income the portion of the total change in fair value attributable to an entity's own credit risk for financial liabilities where the fair value option has been elected. The Company adopted this ASU on January 1, 2018. Upon adoption, the Company reclassified approximately \$1.1 million of unrealized gain related to its equity investment security classified as available-for-sale from accumulated other comprehensive income (AOCI) to retained earnings as a cumulative-effect adjustment, and began recording changes in fair value through earnings.

ASU No. 2014-09, Revenue from Contracts with Customers

In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers in Accounting Standards Codification (ASC) Topic 606 ("ASC 606" or "the New Revenue Standard"), which superseded the revenue recognition requirements in ASC Topic 605, Revenue Recognition ("ASC 605"). The New Revenue Standard sets forth a single, comprehensive revenue recognition model for all contracts with customers to improve comparability. The New Revenue Standard requires revenue recognition to depict the transfer of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The New Revenue Standard can be applied either retrospectively to each prior reporting period presented (i.e., full retrospective adoption) or with the cumulative effect of initially applying the update recognized at the date of the initial application (i.e., modified retrospective adoption) along with additional disclosures.

The Company adopted the New Revenue Standard on January 1, 2018 and all the related amendments using the modified retrospective method. The Company had previously planned on adopting the New Revenue Standard using the full retrospective method, but ultimately determined to adopt the modified retrospective method. The Company recognized the cumulative effect of initially applying the new revenue standard as an adjustment to the opening balance of accumulated deficit as of January 1, 2018. The comparative information for prior periods has not been recasted and continues to be reported under the accounting standards in effect for those periods. The Company recognized unbilled receivables (contract assets) of \$818 million predominantly due to how revenue is recognized for the Company's fixed-fee licensing arrangements (as noted in the first bullet point below), deferred revenue (contract liabilities) of \$2 million, withholding tax liabilities of \$105 million (and a corresponding deferred tax asset of \$105 million, with an offsetting \$16 million valuation allowance), and \$174 million deferred tax liability. In the aggregate, these adjustments resulted in a \$626 million net credit to accumulated deficit.

The most significant impacts of the New Revenue Standard relate to the following:

Revenue recognized for certain patent and technology licensing arrangements has changed under the New Revenue Standard. Revenue for (i) fixed-fee arrangements (including arrangements that include minimum guaranteed

amounts), (ii) variable royalty arrangements that the Company has concluded are fixed in substance and (iii) the fixed portion of hybrid fixed/variable arrangements is recognized upon control over the underlying IP use right transferring to the licensee rather than upon billing under ASC 605, net of the effect of significant financing components calculated using customer-specific, risk-adjusted lending rates and recognized over time on an effective rate basis. As a consequence of

the acceleration of revenue recognition and for matching purposes, all withholding taxes to be paid over the term of these licensing arrangements were expensed on the date the licensing revenue was recognized.

Adoption of the New Revenue Standard resulted in revenue recognition being accelerated for variable royalties and the variable portion of hybrid fixed/variable patent and technology licensing arrangements. Under the New Revenue Standard, royalty revenue is being recognized on the basis of management's estimates of sales or usage, as applicable, of the licensed IP in the period of reference, with a true-up being recorded in subsequent periods based on actual sales or usage as reported by licensees (rather than upon receiving royalty reports from licensees as was the case under ASC 605).

Adoption of the New Revenue Standard also resulted in revenue recognition being accelerated for certain professional services arrangements, including arrangements consisting of significant software customization or modification and development arrangements. Under the New Revenue Standard, such arrangements are accounted for based on man-days incurred during the reporting period as compared to estimated total man-days necessary for contract completion, as the customer either controls the asset as it is created or enhanced by us or, where the asset has no alternative use to us, we are entitled to payment for performance to date and expect to fulfill the contract - revenue recognition is no longer capped to the lesser of inputs in the period or accepted billable project milestones as was the case under ASC 605.

As part of the adoption of the New Revenue Standard, the Company elected to apply the following practical expedients:

The Company applied the practical expedient whereby the Company primarily charges commission costs to expense when incurred because the amortization period would be one year or less for the asset that would have been recognized from deferring these costs.

The Company applied the practical expedient which allowed the Company to reflect the aggregate effect of all contract modifications occurring before the beginning of the earliest period presented when allocating the transaction price to performance obligations.

- The Company applied the practical expedient to not assess a contract asset or contract liability for a significant financing component if the period between the customer's payment and the Company's transfer of goods or services is one year or less.

Adoption of the New Revenue Standard had no impact to cash provided by (used in) operating, financing, or investing activities on the Company's Consolidated Statements of Cash Flows.

In accordance with the New Revenue Standard requirements, the disclosure of the impact of adoption on the Company's Consolidated Statement of Operations and Balance Sheet was as follows (in thousands):

(In thousands)	Year Ended December 31, 2018		
	As Reported	Effect of Change Higher/Lower	Amounts under ASC 605
Consolidated Statement of Operations			
Revenue:			
Royalties	\$130,452	\$172,769	\$303,221
Product revenue	38,690	707	39,397
Contract and other revenue	62,059	(3,576)	58,483
Total revenue	\$231,201	\$169,900	\$401,101
Costs and expenses:			
Interest income and other income (expense), net	\$16,339	\$(27,235)	\$(10,896)

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Provision for income taxes	\$87,329	\$—	\$87,329
Net loss	\$(157,957)	\$142,665	\$(15,292)

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(In thousands)	December 31, 2018		
	As Reported	Effect of Change Higher/Lower	Amounts under ASC 605
Consolidated Balance Sheet			
Assets:			
Unbilled receivables	\$673,616	\$(673,616)	\$ —
Liabilities:			
Deferred revenue	19,566	(1,243)	18,323
Deferred tax liabilities (included in other long-term liabilities)	18,960	(2,079)	16,881
Income taxes payable	93,670	(90,400)	3,270
Stockholders' equity:			
Accumulated deficit	(204,294)	(483,623)	(687,917)

Recent Accounting Pronouncements Not Yet Adopted

In August 2018, the FASB issued ASU 2018-13, "Fair Value Measurement (Topic 820): Disclosure Framework-Changes to the Disclosure Requirements for Fair Value Measurement." The amendments in this ASU remove certain disclosures, modify certain disclosures and add additional disclosures. This ASU is effective for interim and annual reporting periods beginning after December 15, 2019. Early adoption is permitted. Certain disclosures in ASU 2018-13 would need to be applied on a retrospective basis and others on a prospective basis. The Company is currently evaluating the impact that this guidance will have on its consolidated financial statements. In June 2018, the FASB issued ASU 2018-07, "Compensation - Stock Compensation (Topic 718)," to expand the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. This ASU is effective for interim and annual reporting periods beginning after December 15, 2018. Early adoption is permitted, including adoption in an interim period. The Company is currently evaluating the impact that this guidance will have on its consolidated financial statements.

In July 2017, the FASB issued ASU No. 2017-11, "Earnings Per Share (Topic 260), Distinguishing Liabilities from Equity (Topic 480), Derivatives and Hedging (Topic 815)." The amendments in Part I of this ASU change the classification analysis of certain equity-linked financial instruments (or embedded features) with down round features. When determining whether certain financial instruments should be classified as liabilities or equity instruments, a down round feature no longer precludes equity classification when assessing whether the instrument is indexed to an entity's own stock. The amendments also clarify existing disclosure requirements for equity-classified instruments. As a result, a freestanding equity-linked financial instrument (or embedded conversion option) no longer would be accounted for as a derivative liability at fair value as a result of the existence of a down round feature. For freestanding equity classified financial instruments, the amendments require entities that present earnings per share (EPS) in accordance with Topic 260 to recognize the effect of the down round feature when it is triggered. That effect is treated as a dividend and as a reduction of income available to common stockholders in basic EPS. Convertible instruments with embedded conversion options that have down round features are now subject to the specialized guidance for contingent beneficial conversion features (in Subtopic 470-20, Debt-Debt with Conversion and Other Options), including related EPS guidance (in Topic 260). The amendments in Part II of this ASU recharacterize the indefinite deferral of certain provisions of Topic 480 that now are presented as pending content in the FASB codification, to a scope exception. Those amendments do not have an accounting effect. This ASU is effective for interim and annual reporting periods beginning after December 15, 2018. Early adoption is permitted, including adoption in an interim period. The Company is currently evaluating the impact that this guidance will have on its consolidated financial statements.

In March 2017, the FASB issued ASU No. 2017-08, "Receivables - Nonrefundable Fees and Other Costs (Topic 310): Premium Amortization on Purchased Callable Debt Securities," which amends the amortization period for certain purchased callable debt securities held at a premium. This ASU will shorten the amortization period for the premium to be amortized to

the earliest call date. This ASU does not apply to securities held at a discount, which will continue to be amortized to maturity. This ASU is effective for interim and annual reporting periods beginning after December 15, 2018. Early adoption is permitted, including adoption in an interim period. The Company is currently evaluating the impact that this guidance will have on its consolidated financial statements.

In June 2016, the FASB issued ASU No. 2016-13. The purpose of this ASU is to require a financial asset measured at amortized cost basis to be presented at the net amount expected to be collected. Credit losses relating to available-for-sale debt securities should be recorded through an allowance for credit losses. This ASU is effective for interim and annual reporting periods beginning after December 15, 2019. The Company is currently evaluating the impact that this guidance will have on its financial condition and results of operations.

In February 2016, the FASB issued ASU No. 2016-02, "Leases." This ASU requires lessees to recognize right-of-use assets and liabilities for operating leases, initially measured at the present value of the lease payments, on the balance sheet. In addition, it requires lessees to recognize a single lease cost, calculated so that the cost of the lease is allocated over the lease term, generally on a straight-line basis. In July 2018, the FASB issued ASU No. 2018-10, "Codification Improvements to Topic 842, Leases," and ASU No. 2018-11, "Leases (Topic 842)," which allow the application of the new guidance at the beginning of the year of adoption, recognizing a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption, in addition to the method of applying the new guidance retrospectively to each prior reporting period presented. The amendments in ASU No. 2018-10 and ASU No. 2018-11 have the same effective and transition requirements as ASU 2016-02.

This ASU will become effective for the Company in the first quarter of fiscal year 2019. The Company is evaluating the impact that the new accounting standard will have on its consolidated financial statements, which will consist primarily of a balance sheet gross up of right-of-use assets and lease liabilities on the consolidated balance sheets upon adoption, which will increase the Company's total assets and liabilities.

4. Earnings (Loss) Per Share

The following table sets forth the computation of basic and diluted income (loss) per share:

	For the Years Ended December		
	31,		
	2018	2017	2016
Net income (loss) per share:			
Numerator:			
Net income (loss)	\$(157,957)	\$(22,862)	\$ 6,820
Denominator:			
Weighted-average common shares outstanding - basic	108,450	110,198	110,162
Effect of potential dilutive common shares	—	—	2,978
Weighted-average common shares outstanding - diluted	108,450	110,198	113,140
Basic net income (loss) per share	\$(1.46)	\$(0.21)	\$ 0.06
Diluted net income (loss) per share	\$(1.46)	\$(0.21)	\$ 0.06

For the years ended December 31, 2018, 2017 and 2016, options to purchase approximately 1.6 million, 1.5 million and 2.2 million shares, respectively, were excluded from the calculation because they were anti-dilutive after considering proceeds from exercise, taxes and related unrecognized stock-based compensation expense. For the years ended December 31, 2018 and 2017, an additional 2.4 million and 3.7 million shares, respectively, have been excluded from the weighted average dilutive shares because there was a net loss for the periods. These shares do not include the Company's 2023 Notes and the 1.125% convertible senior notes due 2018 (the "2018 Notes"). The par amount of convertible notes is payable in cash equal to the principal amount of the notes plus any accrued and unpaid interest and then the "in-the-money" conversion benefit feature at the conversion price above \$18.93 and \$12.07, respectively, per share is payable in cash, shares of the Company's common stock or a combination of both. The Company has the option to pay cash, issue shares of common stock or any combination thereof for the aggregate amount due upon conversion of the notes. The Company's intent is to settle the principal amount of the notes in cash upon conversion. As a result, upon conversion of the notes, only the amounts payable in excess of the principal

amounts of the notes are considered in diluted earnings per share under the treasury stock method. Refer to Note 10, "Convertible Notes" for more details.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

5. Intangible Assets and Goodwill

In the fourth quarter of 2018 and 2017, the Company performed its annual goodwill impairment analysis for the MID and RSD reporting units, which are the only reporting units with goodwill. The Company estimated the fair value of the reporting units using the income approach which was determined using Level 3 fair value inputs. The utilization of the income approach to determine fair value requires estimates of future operating results and cash flows discounted using an estimated discount rate. Cash flow projections are based on management's estimates of revenue growth rates and operating margins, taking into consideration industry and market conditions.

As of December 31, 2018, the fair value of the MID reporting unit, with \$66.6 million of goodwill, exceeded the carrying value of its net assets by approximately 17% and the fair value of the RSD reporting unit, with \$140.5 million of goodwill, exceeded the carrying value of its net assets by approximately 72%. Key assumptions used to determine the fair value of the MID and RSD reporting units at December 31, 2018, were the revenue growth rates for the forecast period and terminal year, terminal growth rates and discount rates. Certain estimates used in the income approach involve information for new product lines with limited financial history and developing revenue models which increase the risk of differences between the projected and actual performance. The discount rate of 16% for MID and 16.5% for RSD is based on the reporting units' overall risk profile relative to other guideline companies, market adoption of the Company's technology, the reporting units' respective industry as well as the visibility of future expected cash flows. The terminal growth rate applied to determine fair value for both reporting units was 3%, which was based on historical experience as well as anticipated economic conditions, industry data and long term outlook for the business. These assumptions are inherently uncertain.

As of December 31, 2017, the fair value of the MID reporting unit, with \$66.6 million of goodwill, exceeded the carrying value of its net assets by approximately 270% and the fair value of the RSD reporting unit, with \$143.0 million of goodwill, exceeded the carrying value of its net assets by approximately 155%. Key assumptions used to determine the fair value of the MID and RSD reporting units at December 31, 2017, were the revenue growth rates for the forecast period and terminal year, terminal growth rates and discount rates. Certain estimates used in the income approach involve information for new product lines with limited financial history and developing revenue models which increase the risk of differences between the projected and actual performance. The discount rate of 12% for MID and 16.5% for RSD is based on the reporting units' overall risk profile relative to other guideline companies, market adoption of the Company's technology, the reporting units' respective industry as well as the visibility of future expected cash flows. The terminal growth rate applied to determine fair value for both reporting units was 3%, which was based on historical experience as well as anticipated economic conditions, industry data and long term outlook for the business. These assumptions are inherently uncertain.

It is reasonably possible that the businesses could perform significantly below the Company's expectations or a deterioration of market and economic conditions could occur. This would adversely impact the Company's ability to meet its projected results, which could cause the goodwill in any of its reporting units or intangible assets in any of its asset groups to become impaired. Significant differences between these estimates and actual cash flows could materially affect the Company's future financial results. If the reporting units are not successful in commercializing new business arrangements, if the businesses are unsuccessful in signing new license agreements or renewing its existing license agreements, or if the Company is unsuccessful in managing its costs, the revenue and income for these reporting units could adversely and materially deviate from their historical trends and could cause goodwill or intangible assets to become impaired. If the Company determines that its goodwill or intangible assets are impaired, it would be required to record a non-cash charge that could have a material adverse effect on its results of operations and financial position.

Goodwill

The following tables present goodwill information for each of the reportable segments for the years ended December 31, 2018 and December 31, 2017:

Reportable Segment:	December 31, 2017	Impairment Charge of	December 31, 2018	Effect of Exchange
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	Goodwill		Rates (1)	
	(In thousands)			
MID	\$66,643	\$	—\$—	\$ 66,643
RSD	143,018	—	(2,483)	140,535
Total	\$209,661	\$	—\$(2,483)	\$ 207,178

(1) Effect of exchange rates relates to foreign currency translation adjustments for the period.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Reportable Segment:	As of December 31, 2018		
	Gross Carrying	Accumulated Impairment	Net Carrying
	Amount	Losses	Amount
	(In thousands)		
MID	\$66,643	\$ —	\$66,643
RSD	140,535	—	140,535
Other	21,770	(21,770)	—
Total	\$228,948	\$ (21,770)	\$207,178

Reportable Segment:	December 31, 2016	Addition to Goodwill (1)	Impairment Charge of Goodwill	Effect of Exchange Rates (2)	December 31, 2017
MID	\$66,643	\$ —	\$ —	\$ —	\$66,643
RSD	138,151	803	—	4,064	143,018
Total	\$204,794	\$ 803	\$ —	—\$ 4,064	\$209,661

(1) During the first quarter of 2017, the Company corrected an immaterial error related to an overstatement in prepaids and other current assets that originated in 2016.

(2) Effect of exchange rates relates to foreign currency translation adjustments for the period.

Reportable Segment:	As of December 31, 2017		
	Gross Carrying	Accumulated Impairment	Net Carrying
	Amount	Losses	Amount
MID	\$66,643	\$ —	\$66,643
RSD	143,018	—	143,018
Other	21,770	(21,770)	—
Total	\$231,431	\$ (21,770)	\$209,661

Intangible Assets

The components of the Company's intangible assets as of December 31, 2018 and December 31, 2017 were as follows:

	Useful Life	As of December 31, 2018		
		Gross Carrying	Accumulated	Net
		Amount	Amortization	Carrying
		(In thousands)		
Existing technology	3 to 10 years	\$258,903	\$ (213,824)	\$45,079
Customer contracts and contractual relationships	1 to 10 years	67,667	(54,410)	13,257
Non-compete agreements and trademarks	3 years	300	(300)	—
In-process research and development	Not applicable	1,600	—	1,600
Total intangible assets		\$328,470	\$ (268,534)	\$59,936

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

	Useful Life	As of December 31, 2017		
		Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
(In thousands)				
Existing technology	3 to 10 years	\$258,008	\$ (191,554)	\$ 66,454
Customer contracts and contractual relationships	1 to 10 years	68,794	(48,626)	20,168
Non-compete agreements and trademarks	3 years	300	(300)	—
In-process research and development	Not applicable	5,100	—	5,100
Total intangible assets		\$332,202	\$ (240,480)	\$ 91,722

Included in customer contracts and contractual relationships are favorable contracts which are acquired software and service agreements where the Company has no performance obligations. Cash received from these acquired favorable contracts reduce the favorable contract intangible asset. During 2018 and 2017, the Company received \$1.5 million and \$3.6 million related to the favorable contracts, respectively. As of December 31, 2018 and 2017, the net balance of the favorable contract intangible assets was \$0.9 million and \$1.7 million, respectively. The estimated useful life is based on expected payment dates related to the favorable contracts.

During the years ended December 31, 2018 and 2017, the Company acquired patents related to its memory technology for an immaterial amount.

During the years ended December 31, 2018, 2017 and 2016, the Company did not sell any intangible assets.

Amortization expense for intangible assets for the years ended December 31, 2018, 2017, and 2016 was \$29.3 million, \$42.0 million, and \$37.1 million, respectively. The estimated future amortization expense of intangible assets as of December 31, 2018 was as follows (amounts in thousands):

Years Ending December 31:	Amount
2019	\$20,177
2020	19,892
2021	12,975
2022	2,047
2023	1,526
Thereafter	1,719
Total amortizable purchased intangible assets	58,336
In-process research and development	1,600
Total intangible assets	\$59,936

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

6. Segments and Major Customers

Operating segments are based upon Rambus' internal organization structure, the manner in which its operations are managed, the criteria used by its Chief Operating Decision Maker ("CODM") to evaluate segment performance and availability of separate financial information regularly reviewed for resource allocation and performance assessment. The Company determined its CODM to be the Chief Executive Officer and determined its operating segments to be: (1) Memory and Interfaces Division ("MID"), which focuses on the design, development, manufacturing through partnerships and licensing of technology and solutions that is related to memory and interfaces; (2) Rambus Security Division ("RSD"), which focuses on the design, development, deployment and licensing of technologies for chip, system and in-field application security, anti-counterfeiting, smart ticketing and mobile payments; and (3) Emerging Solutions Division ("ESD"), which includes the Rambus Labs team and the development efforts in the area of emerging technologies.

On January 30, 2018, the Company announced its plans to close its lighting division ("RLD") including related manufacturing operations in Brecksville, Ohio. The Company believes that such business was not core to its strategy and growth objectives. As of December 31, 2018, the lighting division has been wound down. Refer to Note 15, "Restructuring Charges" for additional details.

For the year ended December 31, 2018, MID and RSD were considered reportable segments as they met the quantitative thresholds for disclosure as reportable segments. The results of the remaining operating segments are shown under "Other" which includes RLD.

The Company evaluates the performance of its segments based on segment operating income (loss), which is defined as revenue minus segment operating expenses. Segment operating expenses are comprised of direct operating expenses.

Segment operating expenses do not include sales, general and administrative expenses and the allocation of certain expenses managed at the corporate level, such as stock-based compensation, amortization, and certain bonus and acquisition costs. The "Reconciling Items" category includes these unallocated sales, general and administrative expenses as well as corporate level expenses.

The tables below present reported segment operating income (loss) for the years ended December 31, 2018, 2017 and 2016:

	For the Year Ended December 31, 2018			
	MID	RSD	Other	Total
	(In thousands)			
Revenues	\$ 168,528	\$ 60,232	\$ 2,441	\$ 231,201
Segment operating expenses	94,999	53,177	14,560	162,736
Segment operating income (loss)	\$ 73,529	\$ 7,055	\$ (12,119)	\$ 68,465
Reconciling items				(155,432)
Operating loss				\$(86,967)
Interest and other income (expense), net				16,339
Loss before income taxes				\$(70,628)
	For the Year Ended December 31, 2017			
	MID	RSD	Other	Total
	(In thousands)			
Revenues	\$ 280,704	\$ 96,663	\$ 15,729	\$ 393,096
Segment operating expense	86,044	50,010	33,860	169,914
Segment operating income (loss)	\$ 194,660	\$ 46,653	\$ (18,131)	\$ 223,182
Reconciling items				(168,775)
Operating income				\$54,407
Interest and other income (expense), net				(13,418)
Income before income taxes				\$40,989

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

	For the Year Ended December 31, 2016			
	MID	RSD	Other	Total
	(In thousands)			
Revenues	\$239,843	\$76,175	\$20,579	\$336,597
Segment operating expenses	68,460	51,855	30,397	150,712
Segment operating income (loss)	\$171,383	\$24,320	\$(9,818)	\$185,885
Reconciling items				(152,243)
Operating income				\$33,642
Interest and other income (expense), net				(11,005)
Income before income taxes				\$22,637

The Company's CODM does not review information regarding assets on an operating segment basis. Additionally, the Company does not record intersegment revenue or expense.

Accounts receivable from the Company's major customers representing 10% or more of total accounts receivable at December 31, 2018 and December 31, 2017, respectively, was as follows:

Customer	As of	
	December 31, 2018	2017
Customer 1 (MID reportable segment)	12 %	*
Customer 2 (Other segment)	*	12 %
Customer 3 (MID reportable segment)	39 %	*
Customer 4 (MID and RSD reportable segment)	*	13 %
Customer 5 (RSD reportable segment)	*	11 %

* Customer accounted for less than 10% of total accounts receivable in the period

Revenue from the Company's major customers representing 10% or more of total revenue for the years ended December 31, 2018, 2017 and 2016 were as follows:

	Years Ended		
	December 31, 2018	2017	2016
Customer A (MID and RSD reportable segments)	* 17 %	19 %	
Customer B (MID reportable segment)	* 13 %	20 %	
Customer C (MID reportable segment)	* 13 %	13 %	
Customer D (MID reportable segment)	15 %	*	*
Customer E (MID and RSD reportable segments)	11 %	*	*

Revenue from customers in the geographic regions based on the location of contracting parties is as follows:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
USA	\$129,567	\$165,263	\$121,209
Taiwan	21,749	9,953	6,439
South Korea	13,421	115,811	129,542
Japan	23,222	23,378	30,215
Europe	15,668	22,597	16,031
Canada	4,960	4,373	3,478
Singapore	19,140	22,554	17,908
Asia-Other	3,474	29,167	11,775
Total	\$231,201	\$393,096	\$336,597

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

At December 31, 2018, of the \$57.0 million of total property, plant and equipment, approximately \$50.4 million were located in the United States, \$3.8 million were located in India and \$2.8 million were located in other foreign locations. At December 31, 2017, of the \$54.3 million of total property, plant and equipment, approximately \$47.2 million were located in the United States, \$3.4 million were located in India and \$3.7 million were located in other foreign locations.

7. Marketable Securities

Rambus invests its excess cash and cash equivalents primarily in U.S. government-sponsored obligations, commercial paper, corporate notes and bonds, money market funds and municipal notes and bonds that mature within three years. As of December 31, 2018 and 2017, all of the Company's cash equivalents and marketable securities have a remaining maturity of less than one year.

All cash equivalents and marketable securities are classified as available-for-sale. Total cash, cash equivalents and marketable securities are summarized as follows:

(Dollars in thousands)	As of December 31, 2018				
	Fair Value	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Weighted Rate of Return
Money market funds	\$10,080	\$10,080	\$ —	—	2.23 %
U.S. Government bonds and notes	32,630	32,634	—	(4)	2.28 %
Corporate notes, bonds, commercial paper and other	183,998	184,095	—	(97)	2.37 %
Total cash equivalents and marketable securities	226,708	226,809	—	(101)	
Cash	51,056	51,056	—	—	
Total cash, cash equivalents and marketable securities	\$277,764	\$277,865	\$ —	— (101)	
(Dollars in thousands)	As of December 31, 2017				
	Fair Value	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Weighted Rate of Return
Money market funds	\$10,915	\$10,915	\$ —	—	1.16 %
U.S. Government bonds and notes	55,220	55,221	—	(1)	1.12 %
Corporate notes, bonds, commercial paper and other	195,073	195,204	—	(131)	1.39 %
Total cash equivalents and marketable securities	261,208	261,340	—	(132)	
Cash	68,168	68,168	—	—	
Total cash, cash equivalents and marketable securities	\$329,376	\$329,508	\$ —	— (132)	

Available-for-sale securities are reported at fair value on the balance sheets and classified as follows:

	As of	
	December 31, 2018	December 31, 2017
	(Dollars in thousands)	
Cash equivalents	\$64,868	\$157,676
Short term marketable securities	161,840	103,532
Total cash equivalents and marketable securities	226,708	261,208
Cash	51,056	68,168
Total cash, cash equivalents and marketable securities	\$277,764	\$329,376

The Company continues to invest in highly rated quality, highly liquid debt securities. As of December 31, 2018, these securities have a remaining maturity of less than one year. The Company holds all of its marketable securities as available-for-sale, marks them to market, and regularly reviews its portfolio to ensure adherence to its investment policy and to monitor individual investments for risk analysis, proper valuation, and unrealized losses that may be other than temporary.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The estimated fair value of cash equivalents and marketable securities classified by the length of time that the securities have been in a continuous unrealized loss position at December 31, 2018 and 2017 are as follows:

	Fair Value		Gross Unrealized Loss	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
	(In thousands)			
Less than one year				
U.S. Government bonds and notes	\$32,630	\$ 42,581	\$(4)	\$(1)
Corporate notes, bonds and commercial paper	183,998	194,015	(97)	(131)
Total Corporate notes, bonds, and commercial paper and U.S. Government bonds and notes	\$216,628	\$ 236,596	\$(101)	\$(132)

The gross unrealized loss at December 31, 2018 and 2017 was not material in relation to the Company's total available-for-sale portfolio. The gross unrealized loss can be primarily attributed to a combination of market conditions as well as the demand for and duration of the U.S. government-sponsored obligations and corporate notes and bonds. The Company has no intent to sell, there is no requirement to sell and the Company believes that it can recover the amortized cost of these investments. The Company has found no evidence of impairment due to credit losses in its portfolio. Therefore, these unrealized losses were recorded in other comprehensive income (loss).

However, the Company cannot provide any assurance that its portfolio of cash, cash equivalents and marketable securities will not be impacted by adverse conditions in the financial markets, which may require the Company in the future to record an impairment charge for credit losses which could adversely impact its financial results.

See Note 8, "Fair Value of Financial Instruments," for discussion regarding the fair value of the Company's cash equivalents and marketable securities.

8. Fair Value of Financial Instruments

The fair value measurement statement defines fair value as the price that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining fair value, the Company considers the principal or most advantageous market in which the Company would transact, and the Company considers assumptions that market participants would use when pricing the asset or liability, such as inherent risk, transfer restrictions, and risk of non-performance.

The Company's financial instruments are measured and recorded at fair value, except for equity method investments and convertible notes. The Company's non-financial assets, such as goodwill, intangible assets, and property, plant and equipment, are measured at fair value when there is an indicator of impairment and recorded at fair value only when an impairment charge is recognized. The Company's equity method investments are initially recognized at cost, and the carrying amount is increased or decreased to recognize the Company's share of the profit or loss of the investee after the date of acquisition. The Company's share of the investee's profit or loss is recognized in the Company's consolidated statements of operations. Distributions received from an investee reduce the carrying amount of the investment.

Fair Value Hierarchy

The fair value measurement statement requires disclosure that establishes a framework for measuring fair value and expands disclosure about fair value measurements. The statement requires fair value measurement be classified and disclosed in one of the following three categories:

Level 1: Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities.

The Company uses unadjusted quotes to determine fair value. The financial assets in Level 1 include money market funds.

Level 2: Quoted prices in markets that are not active, or inputs which are observable, either directly or indirectly, for substantially the full term of the asset or liability.

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The Company uses observable pricing inputs including benchmark yields, reported trades, and broker/dealer quotes. The financial assets in Level 2 include U.S. government bonds and notes, corporate notes, commercial paper and municipal bonds and notes.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Level 3: Prices or valuation techniques that require inputs that are both significant to the fair value measurement and unobservable (i.e., supported by little or no market activity).

The financial assets in Level 3 previously included a cost investment whose value is determined using inputs that are both unobservable and significant to the fair value measurements, as discussed below.

The Company reviews the pricing inputs by obtaining prices from a different source for the same security on a sample of its portfolio. The Company has not adjusted the pricing inputs it has obtained. The following table presents the financial instruments that are carried at fair value and summarizes the valuation of its cash equivalents and marketable securities by the above pricing levels as of December 31, 2018 and 2017:

	As of December 31, 2018			
	Total	Quoted Market Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(In thousands)			
Money market funds	\$10,080	\$10,080	\$ —	\$ —
U.S. Government bonds and notes	32,630	—	32,630	—
Corporate notes, bonds, commercial paper and other	183,998	—	183,998	—
Total available-for-sale securities	\$226,708	\$10,080	\$216,628	\$ —
	As of December 31, 2017			
	Total	Quoted Market Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(In thousands)			
Money market funds	\$10,915	\$10,915	\$ —	\$ —
U.S. Government bonds and notes	55,220	—	55,220	—
Corporate notes, bonds, commercial paper and other	195,073	1,058	194,015	—
Total available-for-sale securities	\$261,208	\$11,973	\$249,235	\$ —

The Company monitors its investments for other-than-temporary impairment and records appropriate reductions in carrying value when necessary. The Company monitors its investments for other-than-temporary losses by considering current factors, including the economic environment, market conditions, operational performance and other specific factors relating to the business underlying the investment, reductions in carrying values when necessary and the Company's ability and intent to hold the investment for a period of time which may be sufficient for anticipated recovery in the market. Any other-than-temporary loss is reported under "Interest and other income (expense), net" in the consolidated statement of operations. During the years ended December 31, 2018 and 2017, the Company recorded no other-than-temporary impairment charges on its investments.

During the second half of 2018, the Company made an investment in a non-marketable equity security of a private company. This equity investment is accounted for under the equity method of accounting, and the Company accounts for its equity method share of the income (loss) on a quarterly basis. As of December 31, 2018, the Company's 27.7% ownership percentage amounts to a \$3.3 million equity interest in this equity investment and it is included in other assets on the accompanying consolidated balance sheets. The Company recorded an immaterial amount in its

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consolidated statements of operations representing its share of the investee's loss for the year ended December 31, 2018.

During the years ended December 31, 2018 and 2017, there were no transfers of financial instruments between different categories of fair value.

The following table presents the financial instruments that are not carried at fair value but which require fair value disclosure as of December 31, 2018 and 2017:

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

(in thousands)	As of December 31, 2018			As of December 31, 2017		
	Face Value	Carrying Value	Fair Value	Face Value	Carrying Value	Fair Value
1.375% Convertible Senior Notes due 2023	\$172,500	\$141,934	\$150,075	\$172,500	\$135,447	\$173,450
1.125% Convertible Senior Notes due 2018	\$—	\$—	\$—	\$81,207	\$78,451	\$100,802

The fair value of the convertible notes at each balance sheet date is determined based on recent quoted market prices for these notes which is a level 2 measurement. As discussed in Note 10, "Convertible Notes," as of December 31, 2018, the convertible notes are carried at their face value of \$172.5 million, less any unamortized debt discount and unamortized debt issuance costs. The carrying value of other financial instruments, including accounts receivable, accounts payable and other liabilities, approximates fair value due to their short maturities.

Information regarding the Company's goodwill and long-lived assets balances are disclosed in Note 5, "Intangible Assets and Goodwill".

9. Balance Sheet Details

Inventories

Inventories consist of the following:

	As of	
	December 31, 2018	2017
	(In thousands)	
Raw materials	\$2,583	\$2,976
Work in process	145	1,109
Finished goods	4,044	1,074
	\$6,772	\$5,159

Property, Plant and Equipment, net

Property, plant and equipment, net is comprised of the following:

	As of	
	December 31, 2018	2017
	(In thousands)	
Building	\$40,320	\$40,320
Computer software	26,127	18,424
Computer equipment	37,223	36,607
Furniture and fixtures	16,286	16,881
Leasehold improvements	10,824	10,110
Machinery	9,097	16,936
Construction in progress	429	1,831
	140,306	141,109
Less accumulated depreciation and amortization	(83,278)	(86,806)
	\$57,028	\$54,303

Depreciation expense for the years ended December 31, 2018, 2017 and 2016 was \$10.7 million, \$13.3 million and \$13.0 million, respectively.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Accumulated Other Comprehensive Gain (Loss)

Accumulated other comprehensive gain (loss) is comprised of the following:

	As of December 31,	
	2018	2017
	(In thousands)	
Foreign currency translation adjustments	\$(10,040)	\$(5,593)
Unrealized gain (loss) on available-for-sale securities, net of tax	(251)	496
Total	\$(10,291)	\$(5,097)

10. Convertible Notes

The Company's convertible notes are shown in the following table.

(Dollars in thousands)	As of December 31, 2018	As of December 31, 2017
1.375% Convertible Senior Notes due 2023	\$ 172,500	\$ 172,500
1.125% Convertible Senior Notes due 2018	—	81,207
Total principal amount of convertible notes	172,500	253,707
Unamortized discount - 2023 Notes	(28,517)	(34,506)
Unamortized discount - 2018 Notes	—	(2,547)
Unamortized debt issuance costs - 2023 Notes	(2,049)	(2,547)
Unamortized debt issuance costs - 2018 Notes	—	(209)
Total convertible notes	\$ 141,934	\$ 213,898
Less current portion	—	78,451
Total long-term convertible notes	\$ 141,934	\$ 135,447

1.375% Convertible Senior Notes due 2023. On November 17, 2017, the Company issued \$172.5 million aggregate principal amount of 1.375% convertible senior notes pursuant to an indenture (the "2023 Indenture"), by and between the Company and U.S. Bank National Association, as trustee (the "Trustee"). In accounting for the 2023 Notes at issuance, the Company separated the 2023 Notes into liability and equity components pursuant to the accounting standards for convertible debt instruments that may be fully or partially settled in cash upon conversion. As of the date of issuance, the Company determined that the liability component of the 2023 Notes was \$137.3 million and the equity component of the 2023 Notes was \$35.2 million. The fair value of the liability component was estimated using an interest rate for a similar instrument without a conversion feature. The unamortized discount related to the 2023 Notes is being amortized to interest expense using the effective interest method over approximately five years.

The 2023 Notes bear interest at a rate of 1.375% per year, payable semi-annually on February 1 and August 1 of each year, beginning on August 1, 2018. The 2023 Notes will mature on February 1, 2023, unless earlier repurchased by the Company or converted pursuant to their terms.

The Company incurred transaction costs of approximately \$3.3 million related to the issuance of 2023 Notes. In accounting for these costs, the Company allocated the costs to the liability and equity components in proportion to the allocation of proceeds from the issuance of the 2023 Notes to such components. Transaction costs allocated to the liability component of \$2.6 million are netted against the carrying amount of the liability in the consolidated balance sheet and are amortized to interest expense using the effective interest method over the term of the 2023 Notes. The transaction costs allocated to the equity component of \$0.7 million were recorded as additional paid-in capital.

The initial conversion rate of the 2023 Notes is 52.8318 shares of the Company's common stock per \$1,000 principal amount of 2023 Notes (which is equivalent to an initial conversion price of approximately \$18.93 per share). The

conversion rate will be subject to adjustment upon the occurrence of certain specified events but will not be adjusted for accrued and unpaid interest. In addition, upon the occurrence of a make-whole fundamental change (as defined in the 2023 Indenture), the

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Company will, in certain circumstances, increase the conversion rate by a number of additional shares for a holder that elects to convert its 2023 Notes in connection with such make-whole fundamental change.

Prior to the close of business on the business day immediately preceding November 1, 2022, the 2023 Notes will be convertible only under the following circumstances: (1) during any calendar quarter commencing after March 31, 2018, and only during such calendar quarter, if the last reported sale price of the common stock for at least 20 trading days (whether or not consecutive) in a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is more than 130% of the conversion price on each applicable trading day; (2) during the five business day period after any five consecutive trading day period in which, for each trading day of that period, the trading price per \$1,000 principal amount of 2023 Notes for such trading day was less than 98% of the product of the last reported sale price of the common stock and the conversion rate on each such trading day; (3) upon the occurrence of specified distributions to holders of our common stock; or (4) upon the occurrence of specified corporate transactions. On or after November 1, 2022, until the close of business on the second scheduled trading day immediately preceding the maturity date, holders of the 2023 Notes may convert all or a portion of their 2023 Notes regardless of the foregoing conditions. Upon conversion, the Company will pay cash up to the aggregate principal amount of the 2023 Notes to be converted and pay or deliver, as the case may be, cash, shares of common stock or a combination of cash and shares of common stock, at the Company's election, in respect of the remainder, if any, of its conversion obligation in excess of the aggregate principal amount of the 2023 Notes being converted.

The Company may not redeem the 2023 Notes prior to the maturity date and no sinking fund is provided for the 2023 Notes. Upon the occurrence of a fundamental change (as defined in the 2023 Indenture) prior to the maturity date, holders may require the Company to repurchase all or a portion of the 2023 Notes for cash at a price equal to 100% of the principal amount of the 2023 Notes to be repurchased, plus any accrued and unpaid interest to, but excluding, the fundamental change repurchase date.

The 2023 Notes are the Company's senior unsecured obligations and will rank senior in right of payment to any of the Company's indebtedness that is expressly subordinated in right of payment to the notes; equal in right of payment with the Company's existing and future liabilities that are not so subordinated, including its "2018 Notes"; effectively junior in right of payment to any of the Company's secured indebtedness to the extent of the value of the assets securing such indebtedness; and structurally junior to any existing and future indebtedness and other liabilities (including trade payables, but excluding intercompany obligations and liabilities) and any preferred stock of subsidiaries of the Company.

The following events are considered "events of default" with respect to the 2023 Notes, which may result in the acceleration of the maturity of the 2023 Notes:

- (1) the Company defaults in the payment when due of any principal of any of the 2023 Notes at maturity or upon exercise of a repurchase right or otherwise;
- (2) the Company defaults in the payment of any interest, including additional interest, if any, on any of the 2023 Notes, when the interest becomes due and payable, and continuance of such default for a period of 30 days;
- (3) failure by the Company to comply with its obligation to convert the 2023 Notes in accordance with the 2023 Indenture upon exercise of a holder's conversion right;
- (4) failure by the Company to give a fundamental change notice or notice of a specified corporate transaction when due with respect to the Notes;

(5) failure by the Company to comply with any of its other agreements contained in the 2023 Notes or the 2023 Indenture for a period of 60 days after written notice from the Trustee or the holders of at least 25% in aggregate principal amount of the Notes then outstanding has been received;

(6) failure by the Company to pay when due the principal of, or acceleration of, any indebtedness for money borrowed by the Company or any of its Material Subsidiaries (as defined in the 2023 Indenture) in excess of \$40.0 million principal amount, if such indebtedness is not discharged, or such acceleration is not annulled, for a period of 30 days after written notice to the Company by the Trustee or to the Company and the Trustee by holders of 25% or more in aggregate principal amount of the 2023 Notes then outstanding in accordance with the 2023 Indenture; and

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

(7) certain events of bankruptcy, insolvency or reorganization of the Company or any of its Material Subsidiaries (as defined in the Indenture).

If such an event of default, other than an event of default described in clause (7) above with respect to the Company, occurs and is continuing, the Trustee by written notice to the Company, or the holders of at least 25% in aggregate principal amount of the outstanding Notes by notice to the Company and the Trustee, may, and the Trustee at the request of such holders shall, declare 100% of the principal of and accrued and unpaid interest, if any, on all the Notes then outstanding to be due and payable. If an event of default described in clause (7) above occurs, 100% of the principal of and accrued and unpaid interest on the Notes then outstanding will automatically become due and payable.

Note Hedges and Warrants. On November 14, 2017 and November 16, 2017, in connection with the 2023 Notes, the Company entered into privately negotiated convertible note hedge transactions (the “Convertible Note Hedge Transactions”) with respect to the Company’s common stock, par value \$0.001 per share (the “Common Stock”), with certain bank counterparties (the “Counterparties”). The Company paid an aggregate amount of approximately \$33.5 million to the Counterparties for the Convertible Note Hedge Transactions. The Convertible Note Hedge Transactions cover, subject to anti-dilution adjustments substantially similar to those in the 2023 Notes, approximately 9.1 million shares of Common Stock, the same number of shares underlying the 2023 Notes, at a strike price that corresponds to the initial conversion price of the 2023 Notes, and are exercisable upon conversion of the 2023 Notes. The Convertible Note Hedge Transactions will expire upon the maturity of the 2023 Notes. The Convertible Note Hedge Transactions are intended to reduce the potential economic dilution upon conversion of the 2023 Notes. The Convertible Note Hedge Transactions are separate transactions and are not part of the terms of the 2023 Notes. Holders of the 2023 Notes will not have any rights with respect to the Convertible Note Hedge Transactions.

In addition, concurrently with entering into the Convertible Note Hedge Transactions, the Company separately entered into privately negotiated warrant transactions, whereby the Company sold to the Counterparties warrants (the “Warrants”) to acquire, collectively, subject to anti-dilution adjustments, approximately 9.1 million shares of the Common Stock at an initial strike price of approximately \$23.30 per share, which represents a premium of 60% over the last reported sale price of the Common Stock of \$14.56 on November 14, 2017. The Company received aggregate proceeds of approximately \$23.2 million from the sale of the Warrants to the Counterparties. The Warrants are separate transactions and are not part of the 2023 Notes or Convertible Note Hedge Transactions. Holders of the 2023 Notes and Convertible Note Hedge Transactions will not have any rights with respect to the Warrants.

The amounts paid and received for the Convertible Note Hedge Transactions and Warrants have been recorded in additional paid-in capital in the consolidated balance sheets. The fair value of the Convertible Note Hedge Transactions and Warrants are not re-measured through earnings each reporting period. The amounts paid for the Convertible Note Hedge Transactions are tax deductible expenses, while the proceeds received from the Warrants are not taxable.

Impact to Earnings per Share. The 2023 Notes will have no impact to diluted earnings per share until the average price of our Common Stock exceeds the conversion price of \$18.93 per share because the principal amount of the 2023 Notes is required to be settled in cash upon conversion. Under the treasury stock method, in periods the Company reports net income, the Company is required to include the effect of additional shares that may be issued under the 2023 Notes when the price of the Company’s Common Stock exceeds the conversion price. Under this method, the cumulative dilutive effect of the 2023 Notes would be approximately 9.1 million shares if the average price of the Company’s Common Stock is \$18.93. However, upon conversion, there will be no economic dilution from the 2023 Notes, as exercise of the Convertible Note Hedge Transactions eliminates any dilution from the 2023 Notes that

would have otherwise occurred when the price of the Company's Common Stock exceeds the conversion price. The Convertible Note Hedge Transactions are required to be excluded from the calculation of diluted earnings per share, as they would be anti-dilutive under the treasury stock method.

The warrants will have a dilutive effect when the average share price exceeds the warrant's strike price of \$23.30 per share. However, upon conversion, the Convertible Note Hedge Transactions would neutralize the dilution from the 2023 Notes so that there would only be dilution from the warrants.

1.125% Convertible Senior Notes due 2018. On August 16, 2013, the Company issued \$138.0 million aggregate principal amount of 1.125% convertible senior notes pursuant to an indenture (the "2018 Indenture") by and between the Company and U.S. Bank, National Association as the trustee. The 2018 Notes matured on August 15, 2018 (the "Maturity Date"), subject to earlier repurchase or conversion. In accounting for the 2018 Notes at issuance, the Company separated the 2018 Notes into

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

liability and equity components pursuant to the accounting standards for convertible debt instruments that may be fully or partially settled in cash upon conversion. As of the date of issuance, the Company determined that the liability component of the 2018 Notes was \$107.7 million and the equity component of the 2018 Notes was \$30.3 million. The fair value of the liability component was estimated using an interest rate for a similar instrument without a conversion feature. The unamortized discount related to the 2018 Notes was amortized to interest expense using the effective interest method over five years through August 2018.

The Company paid cash interest at an annual rate of 1.125% of the principal amount at issuance, semi-annually in arrears on February 15 and August 15 of each year, commencing on February 15, 2014. The Company incurred transaction costs of approximately \$3.6 million related to the issuance of 2018 Notes. In accounting for these costs, the Company allocated the costs to the liability and equity components in proportion to the allocation of proceeds from the issuance of the 2018 Notes to such components. Transaction costs allocated to the liability component of \$2.8 million were recorded as deferred offering costs and were amortized to interest expense using the effective interest method over five years (the expected term of the debt). The transaction costs allocated to the equity component of \$0.8 million were recorded as additional paid-in capital. The 2018 Notes were the Company's general unsecured obligations, ranking equally in right of payment to all of Rambus' existing and future senior unsecured indebtedness, including the 2023 Notes, and senior in right of payment to any of the Company's future indebtedness that is expressly subordinated to the 2018 Notes.

The 2018 Notes were convertible into shares of the Company's common stock at an initial conversion rate of 82.8329 shares of common stock per \$1,000 principal amount of 2018 Notes, subject to adjustment in certain events. This is equivalent to an initial conversion price of approximately \$12.07 per share of common stock. Holders may have surrendered their 2018 Notes for conversion prior to the close of business day immediately preceding May 15, 2018 only under the following circumstances: (1) during any calendar quarter commencing after the calendar quarter ending on December 31, 2013 (and only during such calendar quarter), if the closing sale price of the common stock for 20 or more trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is more than 130% of the conversion price per share of common stock on the last trading day of the preceding calendar quarter; (2) during the five business day period after any five consecutive trading day period (the "measurement period") in which the trading price (as defined below) per \$1,000 principal amount of notes for each trading day of the measurement period was less than 98% of the product of the closing sale price of the Company's common stock and the conversion rate on each such trading day; (3) upon the occurrence of specified distributions to holders of the Company's common stock; or (4) upon the occurrence of specified corporate events. On or after May 15, 2018 until the close of business on the second scheduled trading day immediately preceding the Maturity Date, holders may have converted their notes at any time, regardless of the foregoing circumstances. If a holder elected to convert its 2018 Notes in connection with certain fundamental changes, as that term is defined in the 2018 Indenture, that occurred prior to the Maturity Date, the Company would have, in certain circumstances, increased the conversion rate for 2018 Notes converted in connection with such fundamental changes by a specified number of shares of common stock.

Upon conversion of the 2018 Notes, the Company will have paid cash up to the aggregate principal amount of the notes to have been converted and paid or delivered, as the case may be, cash, shares of the Company's common stock or a combination of cash and shares of the Company's common stock, at the Company's election, in respect of the remainder, if any, of the Company's conversion obligation in excess of the aggregate principal amount of the notes converted, as specified in the Indenture.

The Company may not have redeemed the 2018 Notes at its option prior to the Maturity Date, and no sinking fund was provided for the 2018 Notes.

Upon the occurrence of a fundamental change, holders may have required the Company to repurchase for cash all or any portion of their notes at a repurchase price equal to 100% of the principal amount of the notes to be repurchased, plus accrued and unpaid interest to, but excluding, the fundamental change repurchase date.

The following events are considered events of default under the Indenture which may have resulted in the acceleration of the maturity of the 2018 Notes:

(1) default in the payment when due of any principal of any of the notes at maturity, upon redemption or upon exercise of a repurchase right or otherwise;

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

- (2) default in the payment of any interest, including additional interest, if any, on any of the notes, when the interest became due and payable, and continuance of such default for a period of 30 days;
- (3) the Company's failure to deliver cash or cash and shares of the Company's common stock (including any additional shares deliverable as a result of a conversion in connection with a make-whole fundamental change, as defined in the Indenture) when required by the Indenture;
- (4) default in the Company's obligation to provide notice of the occurrence of a fundamental change, make-whole fundamental change or distribution to holders of the Company's common stock when required by the Indenture;
- (5) the Company's failure to comply with any of the Company's other agreements in the notes or the 2018 Indenture (other than those referred to in clauses (1) through (4) above) for 60 days after the Company's receipt of written notice to the Company of such default from the trustee or to the Company and the trustee of such default from holders of not less than 25% in aggregate principal amount of the 2018 Notes then outstanding;
- (6) the Company's failure to pay when due the principal of, or acceleration of, any indebtedness for money borrowed by the Company or any of the Company's material subsidiaries in excess of \$40 million principal amount, if such indebtedness is not discharged, or such acceleration is not annulled, for a period of 30 days after written notice thereof is delivered to the Company by the trustee or to the Company and the trustee by the holders of 25% or more in aggregate principal amount of the notes then outstanding without such failure to pay having been cured or waived, such acceleration having been rescinded or annulled (if applicable) and such indebtedness not having been paid or discharged; and
- (7) certain events of bankruptcy, insolvency or reorganization relating to the Company or any of the Company's material subsidiaries (as defined in the Indenture).

If an event of default, other than an event of default described in clause (7) above with respect to the Company, occurred and was continuing, either the trustee or the holders of at least 25% in aggregate principal amount of the notes then outstanding may have declared the principal amount of, and accrued and unpaid interest, including additional interest, if any, on the notes then outstanding to be immediately due and payable. If an event of default described in clause (7) above occurred with respect to the Company, the principal amount of and accrued and unpaid interest, including additional interest, if any, on the notes will have automatically become immediately due and payable.

During the third quarter of 2018, the Company paid upon maturity the remaining \$81.2 million in aggregate principal amount of the 2018 Notes. Additionally, the Company delivered 423,873 shares of the Company's common stock as settlement related to the in-the-money conversion feature of the 2018 Notes at maturity. The value of the shares delivered was approximately \$5.0 million.

During the fourth quarter of 2017, the Company repurchased \$56.8 million aggregate principal amount of the 2018 Notes for a price of \$72.3 million which resulted in a loss on extinguishment of debt of \$1.1 million and \$16.6 million being recorded in stockholders' equity. To determine the impact of the repurchase on stockholders' equity, the Company first determined the fair value of the liability component of the repurchased 2018 Notes immediately prior to the repurchase. The Company then reduced the amount paid for the repurchased 2018 Notes by the fair value of the liability component and allocated the remaining amount paid to the equity component, which resulted in a reduction to stockholders' equity.

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Additional paid-in capital at December 31, 2018 and December 31, 2017 includes \$111.3 million and \$111.3 million, respectively, for each year related to the equity component of the notes.

As of December 31, 2018, none of the conversion conditions were met related to the 2023 Notes. Therefore, the classification of the entire equity component for the 2023 Notes in permanent equity is appropriate as of December 31, 2018.

Interest expense related to the notes for the years ended December 31, 2018, 2017 and 2016 was as follows:

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

	Years Ended December		
	31,	2017	2016
	(in thousands)		
2023 Notes coupon interest at a rate of 1.375%	\$2,372	\$290	\$—
2023 Notes amortization of discount and debt issuance cost at an additional effective interest rate of 4.9%	6,486	768	—
2018 Notes coupon interest at a rate of 1.125%	377	1,488	1,553
2018 Notes amortization of discount and debt issuance cost at an additional effective interest rate of 5.5%	2,756	6,810	6,749
Total interest expense on convertible notes	\$11,991	\$9,356	\$8,302

11. Commitments and Contingencies

On December 15, 2009, the Company entered into a lease agreement for approximately 125,000 square feet of office space located at 1050 Enterprise Way in Sunnyvale, California commencing on July 1, 2010 and expiring on June 30, 2020. The office space is used for the Company's corporate headquarters, as well as engineering, sales, marketing and administrative operations and activities. The annual base rent for these leases includes certain rent abatement and increases annually over the lease term. The Company has two options to extend the lease for a period of 60 months each and a one-time option to terminate the lease after 84 months in exchange for an early termination fee. Pursuant to the terms of the lease, the landlord agreed to reimburse the Company approximately \$9.1 million, which was received by the year ended December 31, 2011. The Company recognized the reimbursement as an additional imputed financing obligation as such payment from the landlord is deemed to be an imputed financing obligation. On November 4, 2011, to better plan for future expansion, the Company entered into an amended lease for its Sunnyvale facility for approximately an additional 31,000-square-foot space commencing on March 1, 2012 and expiring on June 30, 2020. Additionally, a tenant improvement allowance to be provided by the landlord was approximately \$1.7 million. On September 29, 2012, the Company entered into a second amended Sunnyvale lease to reduce the tenant improvement allowance to approximately \$1.5 million. On January 31, 2013, the Company entered into a third amendment to the Sunnyvale lease to surrender the 31,000 square-foot space from the first amendment back to the landlord and recorded a total charge of \$2.0 million related to the surrender of the amended lease.

On March 8, 2010, the Company entered into a lease agreement for approximately 25,000 square feet of office and manufacturing areas, located in Brecksville, Ohio. The office area was used for the RLD group's engineering activities while the manufacturing area is used for the manufacture of prototypes. This lease was amended on September 29, 2011 to expand the facility to approximately 51,000 total square feet and the amended lease will expire on July 31, 2019. The Company has an option to extend the lease for a period of 60 months. On January 30, 2018, the Company announced its plans to close its lighting division and manufacturing operations in Brecksville, Ohio, and began the process to exit the facilities and sell the related equipment. Refer to Note 15, "Restructuring Charges," for additional details.

The Company undertook a series of structural improvements to ready the Sunnyvale and Brecksville facilities for its use. Since these improvements were considered structural in nature and the Company was responsible for any cost overruns, for accounting purposes, the Company was treated in substance as the owner of each construction project during the construction period. At the completion of each construction, the Company concluded that it retained sufficient continuing involvement to preclude de-recognition of the building under the FASB authoritative guidance applicable to the sale leasebacks of real estate. As such, the Company continues to account for the buildings as owned real estate and to record an imputed financing obligation for its obligations to the legal owners.

Monthly lease payments on these facilities are allocated between the land element of the lease (which is accounted for as an operating lease) and the imputed financing obligation. The imputed financing obligation is amortized using the effective interest method and the interest rate was determined in accordance with the requirements of sale leaseback accounting. For the years ended December 31, 2018, 2017 and 2016, the Company recognized in its Consolidated Statements of Operations \$4.3 million, \$4.4 million, and \$4.4 million, respectively, of interest expense in connection with the imputed financing obligation on these facilities. At December 31, 2018 and 2017, the imputed financing obligation balance in connection with these facilities

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

was \$37.6 million and \$38.3 million, respectively, which was primarily classified under long-term imputed financing obligation.

As of December 31, 2018 and 2017, the Company had capitalized \$40.3 million in property, plant and equipment based on the estimated fair value of the portion of the pre-construction shell, construction costs related to the build-out of the facilities and capitalized interest during construction period. At the end of the initial lease term, should the Company decide not to renew the lease, the Company would reverse the equal amounts of the net book value of the building and the corresponding imputed financing obligation.

On November 17, 2017, the Company entered into an Indenture with U.S. Bank, National Association, as trustee, relating to the issuance by the Company of \$172.5 million aggregate principal amount of the 2023 Notes. The aggregate principal amount of the 2023 notes as of December 31, 2018 was \$172.5 million, offset by unamortized debt discount and unamortized debt issuance costs of \$28.5 million and \$2.0 million, respectively, on the accompanying consolidated balance sheets. The unamortized discount related to the 2023 Notes is being amortized to interest expense using the effective method over the remaining 4.1 years until maturity of the 2023 Notes on February 1, 2023. See Note 10, "Convertible Notes," for additional details.

As of December 31, 2018, the Company's material contractual obligations are as follows (in thousands):

	Total	2019	2020	2021	2022	2023
Contractual obligations (1)						
Imputed financing obligation (2)	\$8,081	\$5,677	\$2,404	\$—	\$—	\$—
Leases and other contractual obligations	20,548	5,999	5,117	5,193	3,271	968
Software licenses (3)	12,002	7,510	2,995	1,497	—	—
Convertible notes	172,500	—	—	—	—	172,500
Interest payments related to convertible notes	10,680	2,372	2,372	2,372	2,372	1,192
Total	\$223,811	\$21,558	\$12,888	\$9,062	\$5,643	\$174,660

The above table does not reflect possible payments in connection with uncertain tax benefits of approximately \$23.5 million including \$21.4 million recorded as a reduction of long-term deferred tax assets and \$2.1 million in (1) long-term income taxes payable, as of December 31, 2018. As noted below in Note 16, "Income Taxes," although it is possible that some of the unrecognized tax benefits could be settled within the next 12 months, the Company cannot reasonably estimate the outcome at this time.

With respect to the imputed financing obligation, the main components of the difference between the amount reflected in the contractual obligations table and the amount reflected on the Consolidated Balance Sheets are the (2) interest on the imputed financing obligation and the estimated common area expenses over the future periods. The amount includes the amended Ohio lease and the amended Sunnyvale lease.

(3) The Company has commitments with various software vendors for agreements generally having terms longer than one year.

Rent expense was approximately \$5.2 million, \$4.4 million and \$3.8 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Indemnifications

From time to time, the Company indemnifies certain customers as a necessary means of doing business.

Indemnification covers customers for losses suffered or incurred by them as a result of any patent, copyright, or other intellectual property infringement or any other claim by any third party arising as result of the applicable agreement with the Company. The Company generally attempts to limit the maximum amount of indemnification that the Company could be required to make under these agreements to the amount of fees received by the Company, however, this is not always possible.

12. Equity Incentive Plans and Stock-Based Compensation**Stock Option Plans**

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The Company has two stock option plans under which grants are currently outstanding: the 2006 Equity Incentive Plan (the “2006 Plan”) and the 2015 Equity Incentive Plan (the “2015 Plan”). On April 23, 2015, the Company's stockholders approved the 2015 Plan, which authorizes 4,000,000 shares for future issuance plus the number of shares that remained available for grant under the 2006 Plan as of the effective date of the 2015 Plan. The 2015 Plan became effective and replaced the 2006 Plan on April 23, 2015. Additionally, on April 26, 2018, the Company's stockholders approved an additional 5,500,000 shares for issuance under the 2015 Plan. The 2015 Plan was the Company's only plan for providing stock-based incentive awards to eligible employees, executive officers, non-employee directors and consultants as of December 31, 2018. Grants under all plans typically have a requisite service period of 60 months or 48 months, have straight-line vesting schedules and expire not more than 10 years from date of grant. No further awards will be made under the 2006 Plan, but the 2006 Plan will continue to govern awards previously granted under it. In addition, any shares subject to stock options or other awards granted under the 2006 Plan that on or after the effective date of the 2015 Plan are forfeited, cancelled, exchanged or surrendered or terminate under the 2006 Plan will become available for grant under the 2015 Plan. The Board will periodically review actual share consumption under the 2015 Plan and may make a request for additional shares as needed.

The 2006 Plan was approved by the stockholders in May 2006. The 2006 Plan, as amended, provides for the issuance of the following types of incentive awards: (i) stock options; (ii) stock appreciation rights; (iii) restricted stock; (iv) restricted stock units; (v) performance shares and performance units; and (vi) other stock or cash awards. This plan provides for the granting of awards at less than fair market value of the common stock on the date of grant, but such grants would be counted against the numerical limits of available shares at a ratio of 1.5 to 1.0. The Board of Directors reserved 8,400,000 shares in March 2006 for issuance under this plan, subject to stockholder approval. As of December 31, 2018, 10,074,046 shares of the 35,400,000 shares approved under the plans remain available for grant. The 2015 Plan is now the Company's only plan for providing stock-based incentive compensation to eligible employees, directors and consultants.

A summary of shares available for grant under the Company's plans is as follows:

	Shares Available for Grant
Shares available as of December 31, 2015	11,173,545
Stock options granted	(500,000)
Stock options forfeited	1,081,107
Stock options expired under former plans	(412,467)
Nonvested equity stock and stock units granted (1) (2)	(5,316,675)
Nonvested equity stock and stock units forfeited (1)	1,279,858
Total shares available for grant as of December 31, 2016	7,305,368
Stock options granted	(558,426)
Stock options forfeited	1,978,042
Nonvested equity stock and stock units granted (1) (3)	(5,007,947)
Nonvested equity stock and stock units forfeited (1)	1,334,110
Total shares available for grant as of December 31, 2017	5,051,147
Increase in shares approved for issuance	5,500,000
Stock options granted	(711,479)
Stock options forfeited	877,803
Nonvested equity stock and stock units granted (1) (4)	(4,993,802)
Nonvested equity stock and stock units forfeited (1)	4,350,377
Total shares available for grant as of December 31, 2018	10,074,046

For purposes of determining the number of shares available for grant under the 2015 Plan against the maximum (1) number of shares authorized, each restricted stock granted reduces the number of shares available for grant by 1.5 shares and each restricted stock forfeited increases shares available for grant by 1.5 shares.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

- (2) Amount includes 300,003 shares that had been reserved for potential future issuance related to certain performance unit awards discussed under the section titled "Nonvested Equity Stock and Stock Units" below.
- (3) Amount includes 394,853 shares that had been reserved for potential future issuance related to certain performance unit awards discussed under the section titled "Nonvested Equity Stock and Stock Units" below.
- (4) Amount includes 525,965 shares that have been reserved for potential future issuance related to certain performance unit awards discussed under the section titled "Nonvested Equity Stock and Stock Units" below.

General Stock Option Information

The following table summarizes stock option activity under the stock option plans for the years ended December 31, 2018, 2017 and 2016 and information regarding stock options outstanding, exercisable, and vested and expected to vest as of December 31, 2018.

	Options Outstanding			Aggregate Intrinsic Value
	Number of Shares	Weighted Average Exercise Price per Share	Weighted Average Remaining Contractual Term	
(Dollars in thousands, except per share amounts)				
Outstanding as of December 31, 2015	8,995,017	\$ 10.01		
Options granted	500,000	\$ 12.29		
Options exercised	(1,405,077)	\$ 7.27		
Options forfeited	(1,081,107)	\$ 18.98		
Outstanding as of December 31, 2016	7,008,833	\$ 9.34		
Options granted	558,426	\$ 12.95		
Options exercised	(1,278,856)	\$ 7.34		
Options forfeited	(1,978,042)	\$ 10.68		
Outstanding as of December 31, 2017	4,310,361	\$ 9.78		
Options granted	711,479	\$ 12.84		
Options exercised	(908,146)	\$ 6.70		
Options forfeited	(877,803)	\$ 13.73		
Outstanding as of December 31, 2018	3,235,891	\$ 10.25	4.01	\$ 1,675
Vested or expected to vest at December 31, 2018	3,205,109	\$ 10.22	3.97	\$ 1,675
Options exercisable at December 31, 2018	2,656,079	\$ 9.71	2.98	\$ 1,675

The aggregate intrinsic value in the table above represents the total pre-tax intrinsic value for in-the-money options at December 31, 2018, based on the \$7.67 closing stock price of Rambus' Common Stock on December 31, 2018 on the NASDAQ Global Select Market, which would have been received by the option holders had all option holders exercised their options as of that date. The total number of in-the-money options outstanding and exercisable as of December 31, 2018 was 911,788 and 911,788, respectively.

The following table summarizes the information about stock options outstanding and exercisable as of December 31, 2018:

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Range of Exercise Prices	Options Outstanding		Weighted Average Remaining Contractual Life (in years)	Weighted Average Exercise Price	Options Exercisable	
	Number Outstanding	Weighted Average Remaining Contractual Life (in years)			Number Exercisable	Weighted Average Exercise Price
\$4.13 – \$5.39	53,584	3.6	\$ 4.43	53,584	\$ 4.43	
\$5.46 – \$5.46	362,014	2.2	\$ 5.46	362,014	\$ 5.46	
\$5.63 – \$5.76	324,773	1.0	\$ 5.71	324,773	\$ 5.71	
\$6.83 – \$8.73	275,875	2.5	\$ 7.73	275,875	\$ 7.73	
\$8.76 – \$8.76	540,878	3.1	\$ 8.76	540,878	\$ 8.76	
\$9.53 – \$11.93	325,858	4.1	\$ 11.23	319,736	\$ 11.23	
\$11.93 – \$12.31	433,488	5.4	\$ 12.23	289,796	\$ 12.27	
\$12.46 – \$12.84	582,596	7.6	\$ 12.80	215,598	\$ 12.81	
\$13.60 – \$21.95	274,025	4.3	\$ 16.00	211,025	\$ 16.71	
\$22.72 – \$22.72	62,800	0.8	\$ 22.72	62,800	\$ 22.72	
\$4.13 – \$22.72	3,235,891	4.0	\$ 10.25	2,656,075	\$ 9.71	

Employee Stock Purchase Plans

During the years ended December 31, 2018, 2017, and 2016, the Company had one employee stock purchase plan, the 2015 Employee Stock Purchase Plan (“2015 ESPP”).

On April 23, 2015, the Company's stockholders approved the 2015 ESPP which reserves 2,000,000 shares of the Company's common stock for purchase. On April 26, 2018, the Company's stockholders approved an additional 2,000,000 shares to be reserved for issuance under the 2015 ESPP.

Employees generally will be eligible to participate in the plan if they are employed by Rambus for more than 20 hours per week and more than five months in a fiscal year. The 2015 ESPP provides for six month offering periods, with a new offering period commencing on the first trading day on or after May 1 and November 1 of each year. Under the plans, employees may purchase stock at the lower of 85% of the beginning of the offering period (the enrollment date), or the end of each offering period (the purchase date). Employees generally may not purchase more than the number of shares having a value greater than \$25,000 in any calendar year, as measured at the purchase date. The Company issued 541,395 shares at a weighted average price of \$9.99 per share during the year ended December 31, 2018. The Company issued 615,370 shares at a weighted average price of \$10.47 per share during the year ended December 31, 2017. The Company issued 548,357 shares at a weighted average price of \$9.34 per share during the year ended December 31, 2016. As of December 31, 2018, 2,294,878 shares under the ESPP remain available for issuance.

Stock-Based Compensation**Stock Options**

During the years ended December 31, 2018, 2017 and 2016, Rambus granted 711,479, 558,426 and 500,000 stock options, respectively, with an estimated total grant-date fair value of \$3.0 million, \$2.3 million and \$2.3 million, respectively. During the years ended December 31, 2018, 2017 and 2016, Rambus recorded stock-based compensation related to stock options of \$1.7 million, \$2.8 million and \$4.1 million, respectively.

As of December 31, 2018, there was \$3.9 million of total unrecognized compensation cost, net of expected forfeitures, related to unvested stock-based compensation arrangements granted under the stock option plans. This cost is expected to be recognized over a weighted-average period of 2.8 years. The total fair value of options vested for the years ended December 31, 2018, 2017 and 2016 was \$12.9 million, \$17.3 million and \$28.4 million, respectively. The total intrinsic value of options exercised was \$5.4 million, \$7.5 million and \$8.0 million for the years ended December 31, 2018, 2017 and 2016, respectively. Intrinsic value is the total value of exercised shares based on the price of the Company's Common Stock at the time of exercise less the proceeds received from the employees to

exercise the options.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

During the years ended December 31, 2018, 2017 and 2016, proceeds from employee stock option exercises totaled approximately \$6.1 million, \$9.4 million and \$10.2 million, respectively.

Employee Stock Purchase Plans

During the years ended December 31, 2018, 2017 and 2016, Rambus recorded stock-based compensation related to the ESPP of \$1.4 million, \$1.7 million and \$1.6 million, respectively. As of December 31, 2018, there was \$0.7 million of total unrecognized compensation cost related to stock-based compensation arrangements granted under the ESPP. That cost is expected to be recognized over four months.

There were no tax benefits realized as a result of employee stock option exercises, stock purchase plan purchases, and vesting of equity stock and stock units for the years ended December 31, 2018 and December 31, 2016. Tax benefits realized as a result of employee stock option exercises, stock purchase plan purchases, and vesting of equity stock and stock units for the year ended December 31, 2017, calculated in accordance with accounting for share-based payments were \$1.3 million.

Valuation Assumptions

Rambus estimates the fair value of stock options using the Black-Scholes-Merton model (“BSM”). The BSM model determines the fair value of stock-based compensation and is affected by Rambus’ stock price on the date of the grant as well as assumptions regarding a number of highly complex and subjective variables. These variables include expected volatility, expected life of the award, expected dividend rate, and expected risk-free rate of return. The assumptions for expected volatility and expected life are the two assumptions that significantly affect the grant date fair value. If actual results differ significantly from these estimates, stock-based compensation expense and Rambus’ results of operations could be materially impacted.

The fair value of stock awards is estimated as of the grant date using the BSM option-pricing model assuming a dividend yield of 0% and the additional weighted-average assumptions as listed in the following tables:

The following table presents the weighted-average assumptions used to estimate the fair value of stock options granted that contain only service conditions in the periods presented.

	Stock Option Plan for Years Ended			Employee Stock Purchase Plan for		
	December 31,			Years Ended December 31,		
	2018	2017	2016	2018	2017	2016
Stock Option Plan						
Expected stock price volatility	24%-32%	24%-32%	34%-36%			
Risk free interest rate	2.6%-2.8%	1.8%-2.0%	1.3%-1.7%			
Expected term (in years)	5.8	5.3-5.4	5.4-6.1			
Weighted-average fair value of stock options granted	\$4.23	\$4.09	\$4.59			
Employee Stock Purchase Plan						
Expected stock price volatility				27%-34%	25%-27%	31%-33%
Risk free interest rate				2.05%-2.5%	0.98%-1.3%	0.41%-0.5%
Expected term (in years)				0.5	0.5	0.5
Weighted-average fair value of purchase rights granted under the purchase plan				\$2.59	\$3.07	\$2.88

Expected Stock Price Volatility: Given the volume of market activity in its market traded options, Rambus determined that it would use the implied volatility of its nearest-to-the-money traded options. The Company believes that the use of implied volatility is more reflective of market conditions and a better indicator of expected volatility than historical volatility. If there is not sufficient volume in its market traded options, the Company will use an equally weighted blend of historical and implied volatility.

Risk-free Interest Rate: Rambus bases the risk-free interest rate used in the BSM valuation method on implied yield currently available on the U.S. Treasury zero-coupon issues with an equivalent term. Where the expected terms of Rambus'

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

stock-based awards do not correspond with the terms for which interest rates are quoted, Rambus uses an approximation based on rates on the closest term currently available.

Expected Term: The expected term of options granted represents the period of time that options granted are expected to be outstanding. The expected term was determined based on historical experience of similar awards, giving consideration to the contractual terms of the stock-based awards, vesting schedules and expectations of future employee behavior. The expected term of ESPP grants is based upon the length of each respective purchase period.

Nonvested Equity Stock and Stock Units

The Company grants nonvested equity stock units to officers, directors and employees. For the years ended December 31, 2018, 2017 and 2016, the Company granted nonvested equity stock units totaling 2,978,558, 3,075,396 and 3,344,448 shares, respectively, under the 2015 Plan. These awards have a service condition, generally a service period of four years, except in the case of grants to directors, for which the service period is one year. The fair value of nonvested equity stock units at the date of grant was approximately \$38.1 million, \$40.0 million and \$42.9 million, respectively. During the first quarters of 2018, 2017 and 2016, the Company granted performance unit awards to certain Company executive officers with vesting subject to the achievement of certain performance conditions. The ultimate number of performance units that can be earned can range from 0% to 200% of target depending on performance relative to target over the applicable period. The shares earned will vest on the third anniversary of the date of grant. The Company's shares available for grant has been reduced to reflect the shares that could be earned at the maximum target. For the year ended December 31, 2018, the Company recorded a net reversal of \$1.6 million of stock-based compensation expense related to all outstanding nonvested performance unit awards. The net reversal was primarily due to the termination of the Company's former chief executive officer during the second quarter of 2018. During the years ended December 31, 2017 and 2016, the Company recorded \$4.4 million and \$2.8 million, respectively, of stock-based compensation expense related to these performance unit awards.

During the third quarter of 2017, the Company granted performance unit awards to a Company executive officer with vesting subject to the achievement of certain performance and market conditions. The ultimate number of performance units that can be earned can range from 0% to 150% of target depending on performance relative to target over the applicable period. The shares that will become eligible to vest will be measured over a three-year period ending on December 31, 2019, unless the performance period is shortened because of a change of control of the Company or a termination of the executive officer's employment without cause. The Company's shares available for grant have been reduced to reflect the shares that could be earned at 150% of target. The fair value of the market condition of these performance units was calculated, on its respective grant date, using a binomial valuation model, which estimates the potential outcome of reaching the market condition based on simulated future stock prices. The stock-based compensation expense related to these awards will be recorded over the respective requisite service period of approximately 2.4 years. During the year ended December 31, 2017, the achievement of the performance condition for these performance units was considered probable, and as a result, the Company recognized \$0.5 million of stock-based compensation expense related to these performance unit awards. During the year ended December 31, 2018, the achievement of the performance condition for these performance units was considered improbable due to the termination of the Company's executive officer as noted above, and as a result, the Company reversed all previously recognized stock-based compensation expense related to these performance unit awards.

For the years ended December 31, 2018, 2017 and 2016, the Company recorded stock-based compensation expense of approximately \$18.6 million, \$22.9 million and \$15.3 million, respectively, related to all outstanding nonvested equity stock grants. Unrecognized stock-based compensation related to all nonvested equity stock grants, net of an estimate of forfeitures, was approximately \$35.3 million at December 31, 2018. This cost is expected to be recognized over a weighted average period of 2.3 years.

The following table reflects the activity related to nonvested equity stock and stock units for the three years ended December 31, 2018:

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Nonvested Equity Stock and Stock Units	Shares	Weighted-Average Grant-Date Fair Value
Nonvested at December 31, 2015	3,008,118	\$ 11.32
Granted	3,344,448	\$ 12.84
Vested	(789,864)	\$ 10.98
Forfeited	(699,646)	\$ 11.94
Nonvested at December 31, 2016	4,863,056	\$ 12.33
Granted	3,075,396	\$ 13.02
Vested	(1,216,476)	\$ 12.15
Forfeited	(860,627)	\$ 12.61
Nonvested at December 31, 2017	5,861,349	\$ 12.68
Granted	2,978,558	\$ 12.77
Vested	(1,713,930)	\$ 12.39
Forfeited	(2,266,842)	\$ 12.97
Nonvested at December 31, 2018	4,859,135	\$ 12.71

13. Stockholders' Equity

Share Repurchase Program

On January 21, 2015, the Company's Board approved a new share repurchase program authorizing the repurchase of up to an aggregate of 20.0 million shares. Share repurchases under the plan may be made through the open market, established plans or privately negotiated transactions in accordance with all applicable securities laws, rules, and regulations. There is no expiration date applicable to the plan. This new stock repurchase program replaced the previous program approved by the Board in February 2010 and canceled the remaining shares outstanding as part of the previous authorization.

On March 5, 2018, the Company initiated an accelerated share repurchase program with Citibank N.A. The accelerated share repurchase program is part of the broader share repurchase program previously authorized by the Company's Board on January 21, 2015. Under the accelerated share repurchase program, the Company pre-paid to Citibank N.A., the \$50.0 million purchase price for its common stock and, in turn, the Company received an initial delivery of approximately 3.1 million shares of its common stock from Citibank N.A., in the first quarter of 2018, which were retired and recorded as a \$40.0 million reduction to stockholders' equity. The remaining \$10.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to the Company's stock. During the second quarter of 2018, the accelerated share repurchase program was completed and the Company received an additional 0.7 million shares of its common stock as the final settlement of the accelerated share repurchase program. There were no other repurchases of the Company's common stock during 2018.

On May 1, 2017, the Company initiated an accelerated share repurchase program with Barclays Bank PLC. The accelerated share repurchase program is part of the broader share repurchase program previously authorized by the Company's Board on January 21, 2015. Under the accelerated share repurchase program, the Company pre-paid to Barclays Bank PLC, the \$50.0 million purchase price for its common stock and, in turn, the Company received an initial delivery of approximately 3.2 million shares of its common stock from Barclays Bank PLC, in the second quarter of 2017, which were retired and recorded as a \$40.0 million reduction to stockholders' equity. The remaining \$10.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to the Company's stock. The number of shares to be ultimately purchased by the Company was determined based on the volume weighted average price of the common stock during the terms of the transaction, minus an agreed upon discount between the parties. During the fourth quarter of 2017, the accelerated share repurchase program was completed and the Company received an additional 0.8 million shares of its common stock as

the final settlement of the accelerated share repurchase program. There were no other repurchases of the Company's common stock during 2017.

On October 26, 2015, the Company initiated an accelerated share repurchase program with Citibank, N.A. The accelerated share repurchase program is part of the broader share repurchase program previously authorized by the Company's Board on

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

January 21, 2015. Under the accelerated share repurchase program, the Company pre-paid to Citibank, N.A., the \$100.0 million purchase price for its common stock and, in turn, the Company received an initial delivery of approximately 7.8 million shares of its common stock from Citibank, N.A, which were retired and recorded as a \$80.0 million reduction to stockholders' equity. The remaining \$20.0 million of the initial payment was recorded as a reduction to stockholders' equity as an unsettled forward contract indexed to the Company's stock. The number of shares to be ultimately purchased by the Company was determined based on the volume weighted average price of the common stock during the terms of the transaction, minus an agreed upon discount between the parties. During the second quarter of 2016, the accelerated share repurchase program was completed and the Company received an additional 0.7 million shares of its common stock as the final settlement of the accelerated share repurchase program. There were no other repurchases of the Company's common stock during 2016.

As of December 31, 2018, there remained an outstanding authorization to repurchase approximately 3.6 million shares of the Company's outstanding common stock under the current share repurchase program.

The Company records stock repurchases as a reduction to stockholders' equity. The Company records a portion of the purchase price of the repurchased shares as an increase to accumulated deficit when the price of the shares repurchased exceeds the average original proceeds per share received from the issuance of common stock. During the year ended December 31, 2018, the cumulative price of \$37.5 million was recorded as an increase to accumulated deficit.

Convertible Note Hedge Transactions

On November 14, 2017 and November 16, 2017, in connection with the 2023 Notes, the Company entered into the Convertible Note Hedge Transactions with respect to the Common Stock, with the Counterparties. The Company paid an aggregate amount of approximately \$33.5 million to the Counterparties for the Convertible Note Hedge Transactions. The Convertible Note Hedge Transactions cover, subject to anti-dilution adjustments substantially similar to those in the 2023 Notes, approximately 9.1 million shares of Common Stock, the same number of shares underlying the 2023 Notes, at a strike price that corresponds to the initial conversion price of the 2023 Notes, and are exercisable upon conversion of the 2023 Notes. The Convertible Note Hedge Transactions will expire upon the maturity of the 2023 Notes.

The Convertible Note Hedge Transactions are expected generally to reduce the potential dilution to the Common Stock upon conversion of the 2023 Notes and/or offset any cash payments the Company is required to make in excess of the principal amount of the converted 2023 Notes, as the case may be, in the event that the market price per share of the Common Stock, as measured under the terms of the Convertible Note Hedge Transactions, is greater than the strike price of the Convertible Note Hedge Transactions.

The Convertible Note Hedge Transactions are separate transactions, entered into by the Company with the Counterparties, and are not part of the terms of the 2023 Notes. Holders of the 2023 Notes will not have any rights with respect to the Convertible Note Hedge Transactions. See Note 10, "Convertible Notes," for additional details.

Warrant Transactions

On November 14, 2017 and November 16, 2017, in connection with the 2023 Notes, the Company sold the Warrants to the Counterparties to acquire, collectively, subject to anti-dilution adjustments, approximately 9.1 million shares of the Common Stock at an initial strike price of approximately \$23.30 per share, which represents a premium of 60% over the last reported sale price of the Common Stock of \$14.56 on November 14, 2017. The Company received aggregate proceeds of approximately \$23.2 million from the sale of the Warrants to the Counterparties. The Warrants were sold in private placements to the Counterparties pursuant to an exemption from the registration requirements of

the Securities Act afforded by Section 4(a)(2) of the Securities Act.

If the market price per share of the Common Stock, as measured under the terms of the Warrants, exceeds the strike price of the Warrants, the Warrants could have a dilutive effect, unless the Company elects, subject to certain conditions, to settle the Warrants in cash.

The Warrants are separate transactions, entered into by the Company with the Counterparties, and are not part of the terms of the 2023 Notes. Holders of the 2023 Notes will not have any rights with respect to the Warrants. See Note 10, “Convertible Notes,” for additional details.

14. Benefit Plans

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Rambus has a 401(k) Profit Sharing Plan (the "401(k) Plan") qualified under Section 401(k) of the Internal Revenue Code of 1986. Each eligible employee may elect to contribute up to 60% of the employee's annual compensation to the 401(k) Plan, up to the Internal Revenue Service limit. Rambus, at the discretion of its Board of Directors, may match employee contributions to the 401(k) Plan. The Company matches 50% of eligible employee's contribution, up to the first 6% of an eligible employee's qualified earnings. For the years ended December 31, 2018, 2017 and 2016, Rambus made matching contributions totaling approximately \$2.1 million, \$2.3 million and \$2.0 million, respectively.

15. Restructuring Charges

The 2018 Plan

On January 30, 2018, the Company announced its plans to close its lighting division and manufacturing operations in Brecksville, Ohio, ("the 2018 Plan"). The Company believes that such business was not core to its strategy and growth objectives. In connection therewith, the Company has terminated approximately fifty employees, and began the process to exit the facilities in Ohio and sell the related equipment. The Company expected to record restructuring charges of approximately \$2 million to \$5 million related to employee terminations and severance costs and facility related costs. During the year ended December 31, 2018, the Company recorded a net charge of \$2.2 million, primarily related to the reduction in workforce, of which \$2.0 million was related to the Other segment and \$0.2 million was related to corporate support functions. The 2018 Plan was substantially completed as of December 31, 2018.

The following table summarizes the 2018 Plan restructuring activities during the year ended December 31, 2018:

	Employee Severance and Facilities Related Benefits (In thousands)	Total
Balance at December 31, 2017	\$— \$ —	\$—
Charges	2,234,208	3,442
Payments	(2,226)	(2,453)
Non-cash settlements	— (670)*	(670)
Balance at December 31, 2018	\$7 \$ 312	\$ 319

*The non-cash charge of \$0.7 million is primarily related to the write down of fixed assets and inventory related to the Other segment.

The Company concluded that the closure of its lighting division did not meet the criteria for reporting in discontinued operations in accordance with ASC 360, "Property, Plant, and Equipment". Consequently, the lighting division's long-lived assets were reclassified as held for sale. As of December 31, 2018, the Company sold all property, plant and equipment from its lighting division reclassified as held for sale on the consolidated balance sheets of approximately \$3.5 million and recognized a gain on the disposal of the held for sale assets of approximately \$1.2 million included in restructuring charges on the consolidated statements of operations.

During 2017 and 2016, the Company did not initiate any restructuring programs.

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16. Income Taxes

Income (loss) before taxes consisted of the following:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Domestic	\$(63,829)	\$46,031	\$38,211
Foreign	(6,799)	(5,042)	(15,574)
	\$(70,628)	\$40,989	\$22,637

The provision for (benefit from) income taxes is comprised of:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Federal:			
Current	\$5,451	\$20,661	\$22,115
Deferred	82,726	43,678	(2,198)
State:			
Current	333	495	884
Deferred	522	(43)	(271)
Foreign:			
Current	1,592	1,101	1,275
Deferred	(3,295)	(2,041)	(5,988)
	\$87,329	\$63,851	\$15,817

The differences between Rambus' effective tax rate and the U.S. federal statutory regular tax rate are as follows:

	Years Ended December 31,		
	2018	2017	2016
Expense at U.S. federal statutory rate	21.0 %	35.0 %	35.0 %
Expense (benefit) at state statutory rate	(1.2)	0.7	1.8
Withholding tax	(7.7)	50.1	97.0
Foreign rate differential	(0.2)	2.8	4.1
Research and development ("R&D") credit	2.2	(3.9)	(8.3)
Executive compensation	(0.1)	1.8	1.5
Stock-based compensation	(2.8)	14.9	34.8
Foreign tax credit	7.7	(50.1)	(97.0)
Foreign derived intangible income deduction	14.8	—	—
Impact of corporate rate change on deferred taxes	—	50.6	—
Other	0.7	1.4	1.0
Valuation allowance	(158.0)	52.5	—
	(123.6)%	155.8 %	69.9 %

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The components of the net deferred tax assets (liabilities) are as follows:

	As of December 31,	
	2018	2017
	(In thousands)	
Deferred tax assets:		
Depreciation and amortization	\$13,085	\$10,840
Other timing differences, accruals and reserves	8,272	8,766
Deferred equity compensation	6,236	7,979
Net operating loss carryovers	21,259	16,335
Tax credits	253,890	157,051
Total gross deferred tax assets	302,742	200,971
Deferred tax liabilities:		
Convertible debt	(207)	(791)
Deferred revenue	(143,182)	—
Total gross deferred tax liabilities	(143,389)	(791)
Total net deferred tax assets	159,353	200,180
Valuation allowance	(173,878)	(50,911)
Net deferred tax assets (liabilities)	\$(14,525)	\$149,269

As of December 31,

2018 2017

(In thousands)

Reported as:

Non-current deferred tax assets	\$4,435	\$159,099
Non-current deferred tax liabilities (18,960)	(9,830)	
Net deferred tax assets (liabilities)	\$(14,525)	\$149,269

On December 22, 2017, the Tax Act was enacted into law in the United States. The Tax Act, among other things, lowered U.S. corporate income tax rates from 35% to 21%, implemented a territorial tax system, and imposed a one-time transition tax on deemed repatriated earnings of non-U.S. subsidiaries.

The U.S. tax law changes, including limitations on various business deductions such as executive compensation under Internal Revenue Code §162(m), will not impact the Company's federal tax expense in the short-term due to the Company's tax credit carryovers and associated valuation allowance. The Tax Act's new international rules, including Global Intangible Low-Taxed Income ("GILTI"), Foreign Derived Intangible Income ("FDII"), and Base Erosion Anti-Avoidance Tax ("BEAT") are effective beginning in 2018. The Company has included these effects of the Tax Act in its financial statements.

Regarding the new GILTI tax rules, the Company is required to make an accounting policy election to either treat taxes due on future GILTI inclusions in U.S. taxable income as a current period expense when incurred or reflect such portion of the future GILTI inclusions in U.S. taxable income that relate to existing basis differences in the Company's current measurement of deferred taxes. The Company has made a policy election to treat GILTI taxes as a current period expense.

Pursuant to SEC Staff Accounting Bulletin ("SAB") 118 (regarding the application of ASC 740, Income Taxes ("ASC 740")) associated with the enactment of the Tax Act, the Company believes its accounting under ASC 740 for the provisions of the Tax Act is now complete.

The Company periodically evaluates the realizability of its net deferred tax assets based on all available evidence, both positive and negative. During the third quarter of 2018, the Company assessed the changes in its underlying facts and circumstances and evaluated the realizability of its existing deferred tax assets based on all available evidence, both positive and negative, and the weight accorded to each, and concluded a full valuation allowance associated with U.S. federal and California deferred tax assets was appropriate. The basis for this conclusion was derived primarily

from the fact that the Company completed its forecasting process during the third quarter of 2018. At a domestic level, losses are expected in future periods in part due to the impact of the adoption of ASC 606. In addition, the decrease in the U.S. federal tax rate from 35% to

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

21% as a result of U.S. tax reform has further reduced the Company's ability to utilize its deferred tax assets. In light of the above factors, the Company concluded that it is not more likely than not that it can realize its U.S. deferred tax assets. As such, the Company has set up and maintains a full valuation allowance against its U.S. federal deferred tax assets.

The following table presents the tax valuation allowance information for the years ended December 31, 2018, 2017 and 2016:

	Balance at Beginning of Period	Charged (Credited) to Operations	Charged to Other Account*	Valuation Allowance Release	Valuation Allowance Set up	Balance at End of Period
Tax Valuation Allowance						
Year ended December 31, 2016	\$ 20,717	—	2,812	—	—	\$23,529
Year ended December 31, 2017	\$ 23,529	—	5,855	—	21,527	\$50,911
Year ended December 31, 2018	\$ 50,911	—	9,238	—	113,729	\$ 173,878

* Amounts not charged to operations are charged to other comprehensive income or deferred tax assets (liabilities).

As of December 31, 2018, Rambus had California and other state net operating loss carryforwards of \$244.1 million and \$124.6 million, respectively. The California net operating losses will begin to expire in 2020. As of December 31, 2018, Rambus had federal research and development tax credit carryforwards of \$34.3 million and foreign tax credits of \$215.5 million. The federal foreign tax credits and research and development credits will begin to expire in 2020. If not utilized, approximately \$51.3 million of federal foreign tax credits will expire in 2020. As of December 31, 2018, Rambus had California research and development tax credit carryforwards of \$28.5 million. The California research and development credits carry forward indefinitely.

In the event of a change in ownership, as defined under federal and state tax laws, Rambus' net operating loss and tax credit carryforwards could be subject to annual limitations. The annual limitations could result in the expiration of the net operating loss and tax credit carryforwards prior to utilization.

As of December 31, 2018, the Company had \$23.5 million of unrecognized tax benefits including \$21.4 million recorded as a reduction of long-term deferred tax assets and \$2.1 million recorded in long term income taxes payable. If recognized, \$2.1 million would be recorded as an income tax benefit in the consolidated statements of operations.

As of December 31, 2017, the Company had \$22.6 million of unrecognized tax benefits including \$20.4 million recorded as a reduction of long-term deferred tax assets and \$2.2 million recorded in long term income taxes payable. If recognized, \$2.2 million would be recorded as an income tax benefit in the consolidated statements of operations. It is reasonably possible that a reduction of \$0.2 million of existing unrecognized tax benefits could occur in the next 12 months.

A reconciliation of the beginning and ending amounts of unrecognized income tax benefits for the years ended December 31, 2018, 2017 and 2016 is as follows (amounts in thousands):

	Years Ended December 31,		
	2018	2017	2016
Balance at January 1	\$22,652	\$21,925	\$20,836
Tax positions related to current year:			
Additions	1,032	1,083	1,225
Tax positions related to prior years:			
Additions	115	16	256
Reductions	(317)	(372)	(171)
Settlements	—	—	(221)
Balance at December 31	\$23,482	\$22,652	\$21,925

Rambus recognizes interest and penalties related to uncertain tax positions as a component of the income tax provision (benefit). At December 31, 2018 and 2017, an immaterial amount of interest and penalties are included in long-term income taxes payable.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Rambus files income tax returns for the U.S., California, India, the U.K., the Netherlands and various other state and foreign jurisdictions. The U.S. federal returns are subject to examination from 2015 and forward. The California returns are subject to examination from 2010 and forward. In addition, any research and development credit carryforward or net operating loss carryforward generated in prior years and utilized in these or future years may also be subject to examination. The India returns are subject to examination from fiscal year ending March 2012 and forward. The Company is currently under examination by the IRS for the 2015 tax year and California for the 2010 and 2011 tax years. The Company's India subsidiary is under examination by the Indian tax administration for tax years beginning with 2011, except for 2014, which was assessed in the Company's favor. The Company's France subsidiary is under examination by the French tax agency for the 2013 to 2017 tax years. These examinations may result in proposed adjustments to the income taxes as filed during these periods. Management regularly assesses the likelihood of outcomes resulting from income tax examinations to determine the adequacy of their provision for income taxes and believes their provision for unrecognized tax benefits is adequate.

Additionally, the Company's future effective tax rates could be adversely affected by earnings being higher than anticipated in countries where the Company has higher statutory rates or lower than anticipated in countries where it has lower statutory rates, by changes in valuation of its deferred tax assets and liabilities or by changes in tax laws or interpretations of those laws.

At December 31, 2018, no other income taxes (state or foreign) have been provided on undistributed earnings of approximately \$12.1 million from the Company's international subsidiaries since these earnings have been, and under current plans will continue to be, indefinitely reinvested outside the United States. However, if such earnings were distributed, the Company would incur approximately \$1.3 million of foreign withholding taxes and an immaterial amount of U.S. taxes.

17. Litigation and Asserted Claims

Rambus is not currently a party to any material pending legal proceeding; however, from time to time, Rambus may become involved in legal proceedings or be subject to claims arising in the ordinary course of its business. Although the results of litigation and claims cannot be predicted with certainty, the Company currently believes that the final outcome of these ordinary course matters will not have a material adverse effect on our business, operating results, financial position or cash flows. Regardless of the outcome, litigation can have an adverse impact on the Company because of defense and settlement costs, diversion of management attention and resources and other factors.

The Company records a contingent liability when it is probable that a loss has been incurred and the amount is reasonably estimable in accordance with accounting for contingencies.

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Supplementary Financial Data

RAMBUS INC.

CONSOLIDATED SUPPLEMENTARY FINANCIAL DATA

Quarterly Statements of Operations

(Unaudited)

	Dec. 31, 2018	Sept. 30, 2018	June 30, 2018	March 31, 2018	Dec. 31, 2017	Sept. 30, 2017	June 30, 2017	March 31, 2017
	(In thousands, except for per share amounts)							
Total revenue (3)	\$68,563	\$59,754	\$56,458	\$46,426	\$101,891	\$99,134	\$94,720	\$97,351
Total operating costs and expenses	\$72,763	\$78,921	\$76,445	\$90,039	\$86,172	\$82,124	\$86,476	\$83,917
Operating income (loss) (3)	\$(4,200)	\$(19,167)	\$(19,987)	\$(43,613)	\$15,719	\$17,010	\$8,244	\$13,434
Net income (loss) (1) (3)	\$(2,018)	\$(104,893)	\$(15,357)	\$(35,689)	\$(36,168)	\$7,695	\$2,605	\$3,006
Net income (loss) per share — basic (3)	\$(0.02)	\$(0.97)	\$(0.14)	\$(0.33)	\$(0.33)	\$0.07	0.02	\$0.03
Net income (loss) per share — diluted (3)	\$(0.02)	\$(0.97)	\$(0.14)	\$(0.33)	\$(0.33)	\$0.07	0.02	\$0.03
Shares used in per share calculations — basic (2)	108,826	107,897	107,737	109,358	109,737	109,555	110,060	111,464
Shares used in per share calculations — diluted (2)	108,826	107,897	107,737	109,358	109,737	113,119	112,565	115,325

The net loss for the quarter ended September 30, 2018 included a \$91.3 million impact of an increase in our deferred tax asset valuation allowance. The net loss for the quarter ended December 31, 2017 included a \$21.5 (1) million impact due to the recording of a deferred tax asset valuation allowance and \$20.7 million related to re-measurement of deferred tax assets as a result of the tax law changes. Refer to Note 16, "Income Taxes" of Notes to Consolidated Financial Statements of this Form 10-K.

The quarterly financial information includes the impact of the accelerated share repurchase program as follows: 0.7 million shares in the quarter ended June 30, 2018 and 3.1 million shares repurchased in the quarter ended March (2) 31, 2018 and 0.8 million shares in the quarter ended December 31, 2017 and 3.2 million shares repurchased in the quarter ended June 30, 2017. Refer to Note 13, "Stockholders' Equity" of Notes to Consolidated Financial Statements of this Form 10-K.

Total revenue, operating loss, net loss and net loss per share for the quarters ended December 31, 2018, September (3) 30, 2018, June 30, 2018 and March 31, 2018 reflect the impact from the adoption of ASC 606. See Note 3, "Recent Accounting Pronouncements," of Notes to Consolidated Financial Statements of this Form 10-K for further discussion.

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INDEX TO EXHIBITS

Exhibit Number	Description of Document
3.1(1)	<u>Amended and Restated Certificate of Incorporation of Registrant filed May 29, 1997.</u>
3.2(2)	<u>Certificate of Amendment of Amended and Restated Certificate of Incorporation of Registrant filed June 14, 2000.</u>
3.3(3)	<u>Amended and Restated Bylaws of Registrant dated April 25, 2013.</u>
4.1(4)	<u>Form of Registrant's Common Stock Certificate.</u>
4.3(5)	<u>Indenture, dated November 17, 2017, between Rambus Inc and U.S. Bank National Association (including form of 1.375% Convertible Senior Note due 2023).</u>
10.1(6)	<u>Form of Indemnification Agreement entered into by Registrant with each of its directors and executive officers.</u>
10.2(7)*	<u>Form of Change of Control Severance Agreement, Agreement entered into by Registrant with each of its named executive officers other than its chief executive officer.</u>
10.4(8)*	<u>2006 Equity Incentive Plan, as amended.</u>
10.5(8)*	<u>Forms of agreements under the 2006 Equity Incentive Plan, as amended.</u>
10.6(8)*	<u>2006 Employee Stock Purchase Plan, as amended.</u>
10.7(9)*	<u>2015 Equity Incentive Plan, as amended.</u>
10.8(10)*	<u>Form of Restricted Stock Unit Agreement (2015 Equity Incentive Plan).</u>
10.9(10)*	<u>Form of Stock Option Agreement (2015 Equity Incentive Plan).</u>
10.10(9)*	<u>2015 Employee Stock Purchase Plan, as amended.</u>
10.11(11)	<u>Triple Net Space Lease, dated as of December 15, 2009, by and between Registrant and MT SPE, LLC.</u>
10.12(12)**	<u>Settlement Agreement, dated January 19, 2010, among Registrant, Samsung Electronics Co., Ltd, Samsung Electronics America, Inc., Samsung Semiconductor, Inc. and Samsung Austin Semiconductor, L.P.</u>
10.13(12)**	<u>Semiconductor Patent License Agreement, dated January 19, 2010, between Registrant and Samsung Electronics Co., Ltd.</u>
10.14(13)	<u>First Amendment of Lease, dated November 4, 2011, by and between Registrant and MT SPE, LLC.</u>
10.15(14)	<u>Employment Agreement between the Company and Luc Seraphin, dated as of October 25, 2018.</u>
10.16(14)	<u>Amended and Restated Change of Control Severance Agreement between the Company and Luc Seraphin, dated as of October 25, 2018.</u>
10.17(15)**	<u>Settlement Agreement, dated June 11, 2013, among Registrant, SK hynix and certain SK hynix affiliates.</u>
10.18(16)**	<u>Semiconductor Patent License Agreement, dated June 11, 2013, between Registrant and SK hynix.</u>
10.19(17)**	<u>Settlement Agreement, dated December 9, 2013, between Rambus Inc., Micron Technology, Inc., and certain Micron affiliates.</u>
10.20(17)**	<u>Semiconductor Patent License Agreement, dated December 9, 2013, between Rambus, Inc. and Micron Technology, Inc.</u>
10.21(17)**	<u>Amendment to Semiconductor Patent License Agreement, dated December 30, 2013, by and between Rambus Inc. and Samsung Electronics Co., Ltd.</u>
10.22(18)**	<u>Amendment 1 to Semiconductor Patent License Agreement, dated June 17, 2015, by and between Rambus Inc. and SK hynix Inc.</u>
10.23(19)	<u>Asset Purchase Agreement, dated June 29, 2016, by and between Rambus Inc., Bell ID Singapore Ptd Ltd, Inphi Corporation and Inphi International Pte. Ltd.</u>
10.24(20)	<u>Offer Letter, dated September 9, 2016, by and between Rambus Inc. and Rahul Mathur.</u>
10.25(5)	<u>Form of Convertible Note Hedge Confirmation.</u>
10.26(5)	<u>Form of Warrant Confirmation.</u>
12.1(21)	<u>Computation of ratio of earnings to fixed charges.</u>
21.1	<u>Subsidiaries of Registrant.</u>

23.1 Consent of Independent Registered Public Accounting Firm.

24 Power of Attorney (included in signature page).

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31.1 Certification of Principal Executive Officer, pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

31.2 Certification of Principal Financial Officer, pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

32.1 Certification of Principal Executive Officer, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

32.2 Certification of Principal Financial Officer, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

101.INS± XBRL Instance Document

101.SCH± XBRL Taxonomy Extension Schema Document

101.CAL± XBRL Taxonomy Extension Calculation Linkbase Document

101.LAB± XBRL Taxonomy Extension Label Linkbase Document

101.PRE± XBRL Taxonomy Extension Presentation Linkbase Document

101.DEF± XBRL Taxonomy Extension Definition Linkbase Document

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- * Management contracts or compensation plans or arrangements in which directors or executive officers are eligible to participate.
 - ** Confidential treatment has been granted with respect to certain portions of this exhibit. Omitted portions have been filed separately with the Securities and Exchange Commission.
XBRL (Extensible Business Reporting Language) information is furnished and not filed or a part of a registration statement or prospectus for purposes of Sections 11 or 12 of the Securities Act of 1933, is deemed not filed for purposes of Section 18 of the Securities Exchange Act of 1934, and otherwise is not subject to liability under these sections.
 - ±
- (1) Incorporated by reference to the Form 10-K filed on December 15, 1997.
 - (2) Incorporated by reference to the Form 10-Q filed on May 4, 2001.
 - (3) Incorporated by reference to the Form 8-K filed on April 30, 2013.
 - (4) Incorporated by reference to the Form S-1/A (file no. 333-22885) filed on April 24, 1997.
 - (5) Incorporated by reference to the Form 8-K filed on November 17, 2017.
 - (6) Incorporated by reference to the Form S-1 (file no. 333-22885) filed on March 6, 1997.
 - (7) Incorporated by reference to the Form 8-K filed on March 9, 2015.
 - (8) Incorporated by reference to the Form 8-K filed on April 30, 2014.
 - (9) Incorporated by reference to the Form 8-K filed on April 27, 2018.
 - (10) Incorporated by reference to the Form 10-Q filed on July 23, 2015.
 - (11) Incorporated by reference to the Form 10-K filed on February 26, 2010.
 - (12) Incorporated by reference to the Form 10-Q filed on May 3, 2010.
 - (13) Incorporated by reference to the Form 10-K filed on February 24, 2012.
 - (14) Incorporated by reference to the Form 8-K filed on October 29, 2018.
 - (15) Incorporated by reference to the Form 10-Q/A filed on January 13, 2014.
 - (16) Incorporated by reference to the Form 10-Q filed on July 29, 2013.
 - (17) Incorporated by reference to the Form 10-K filed on February 21, 2014.
 - (18) Incorporated by reference to the Form 10-Q filed on July 23, 2015.
 - (19) Incorporated by reference to the Form 10-Q filed on July 22, 2016.
 - (20) Incorporated by reference to the Form 8-K filed on September 21, 2016.

(21) Incorporated by reference to the Form S-3 filed on June 22, 2009.

SIGNATURES

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

RAMBUS INC.

By: /s/ RAHUL MATHUR

Rahul Mathur

Senior Vice President, Finance and Chief Financial Officer

Date: February 22, 2019

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Luc Seraphin and Rahul Mathur as his true and lawful agent, proxy and attorney-in-fact, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to (i) act on, sign, and file with the Securities and Exchange Commission any and all amendments to this Annual Report on Form 10-K, together with all schedules and exhibits thereto, (ii) act on, sign, and file such certificates, instruments, agreements and other documents as may be necessary or appropriate in connection therewith, and (iii) take any and all actions that may be necessary or appropriate to be done, as fully for all intents and purposes as he might or could do in person, hereby approving, ratifying and confirming all that such agent, proxy and attorney-in-fact or any of his substitutes may lawfully do or cause to be done by virtue thereof.

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

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Signature	Title	Date
/s/ LUC SERAPHIN Luc Seraphin	Chief Executive Officer, President and Director (Principal Executive Officer)	February 22, 2019
/s/ RAHUL MATHUR Rahul Mathur	Senior Vice President, Finance and Chief Financial Officer (Principal Financial Officer)	February 22, 2019
/s/ KEITH JONES Keith Jones	Vice President, Chief Accounting Officer and Corporate Controller (Principal Accounting Officer)	February 22, 2019
/s/ ERIC STANG Eric Stang	Chairman of the Board of Directors	February 22, 2019
/s/ ELLIS THOMAS FISHER Ellis Thomas Fisher	Director	February 22, 2019
/s/ EMIKO HIGASHI Emiko Higashi	Director	February 22, 2019
/s/ CHARLES KISSNER Charles Kissner	Director	February 22, 2019
/s/ DAVID SHRIGLEY David Shrigley	Director	February 22, 2019
/s/ SANJAY SARAF Sanjay Saraf	Director	February 22, 2019