UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended
December 31, 2021
Or

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

For the transition period from to

Commission file number: 000-22339

RAMBUS INC.

(Exact name of registrant as specified in its charter)

Delaware	**94-3112828**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
4453 North First Street **Suite 100** **San Jose , California**	**95134**
(Address of principal executive offices)	(Zip Code)

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

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

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

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

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

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

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

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

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

Large accelerated filer	☑	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

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

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

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

The aggregate market value of the Registrant’s Common Stock held by non-affiliates of the Registrant as of June 30, 2021 was approximately $1.8 billion based upon the closing price reported for such date on The NASDAQ Global Select Market. For purposes of this disclosure, shares of Common Stock held by officers and directors of the Registrant and persons that may be deemed to be affiliates under the Act have been excluded. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The number of outstanding shares of the Registrant’s Common Stock, $.001 par value, was 109,315,425 as of January 31, 2022.

DOCUMENTS INCORPORATED BY REFERENCE

Certain information is incorporated into Part III of this report by reference to the Proxy Statement for the Registrant’s annual meeting of stockholders to be held on or about April 28, 2022 to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Form 10-K.

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NOTE REGARDING FORWARD-LOOKING STATEMENTS

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

- Success in the markets of our products and services or our customers’ products;
- Sources of competition;
- Research and development costs and improvements in technology;
- Sources, amounts and concentration of revenue, including royalties;
- Success in signing and renewing license agreements;
- Terms of our licenses and amounts owed under license agreements;
- Technology product development;
- Dispositions, acquisitions, mergers or strategic transactions and our related integration efforts;
- Impairment of goodwill and long-lived assets;
- Pricing policies of our customers;
- Changes in our strategy and business model, including the expansion of our portfolio of inventions, products, software, services and solutions to address additional markets in memory, chip and security;
- Deterioration of financial health of commercial counterparties and their ability to meet their obligations to us;
- Effects of security breaches or failures in our or our customers’ products and services on our business;
- Engineering, sales and general and administration expenses;
- Contract revenue;
- Operating results;
- Continued product revenue growth;
- International licenses, operations and expansion;
- Effects of changes in the economy and credit market on our industry and business;
- Impact of the ongoing COVID-19 pandemic, including its most recent variants, on our business operations and financial results;
- Ability to identify, attract, motivate and retain qualified personnel, especially in light of a hyper-competitive compensation environment;
- Effects of government regulations on our industry and business;
- Manufacturing, shipping and supply partners, supply chain availability and/or sale and distribution channels;
- Growth in our business;
- Methods, estimates and judgments in accounting policies;
- Adoption of new accounting pronouncements;
- Effective tax rates, including as a result of recent U.S. tax legislation;
- Restructurings and plans of termination;
- Realization of deferred tax assets/release of deferred tax valuation allowance;
- Trading price of our common stock;
- Internal control environment;
- The level and terms of our outstanding debt and the repayment or financing of such debt;
- Protection of intellectual property (“IP”);
- Any changes in laws, agency actions and judicial rulings that may impact the ability to enforce our IP rights;
- Indemnification and technical support obligations;
- Equity repurchase programs;
- Issuances of debt or equity securities, which could involve restrictive covenants or be dilutive to our existing stockholders;
- Effects of fluctuations in interest rates and currency exchange rates;
- Effects of a rising rate of inflation; and
- Outcome and effect of potential future IP litigation and other significant litigation.

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

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

PART I

Rambus is a trademark of Rambus Inc. Other trademarks or copyrights that may be mentioned in this Annual Report on Form 10-K are the property of their respective owners.

Item 1. *Business*

Overview

Rambus produces products and innovations that address the fundamental challenges of accelerating data. We make industry-leading chips and IP that enable critical performance improvements for data center and other growing markets. The ongoing shift to the cloud, along with the widespread advancement of artificial intelligence ("AI") across the data center, edge and Internet of Things ("IoT") end points, has led to exponential growth in data usage and tremendous demands on data infrastructure. Creating fast and safe connections, both in and across systems, remains one of the most mission-critical design challenges limiting performance in advanced hardware for these markets. The data center continues to be the Company's primary focus market, demanding the highest performance and security, and drives greater than 80% of the revenue from Rambus chip and silicon IP sales.

As an industry pioneer with over 30 years of advanced semiconductor design experience, Rambus is ideally positioned to address the challenges of moving and protecting data. We are a leader in high-performance memory subsystems, providing chips, IP and innovations that maximize the performance and security in data-intensive systems. Whether in the cloud, at the edge or in your hand, real-time and immersive applications depend on data throughput and integrity. Rambus products and innovations deliver the increased bandwidth, capacity and security required to meet the world's data needs and drive ever-greater end-user experiences.

Rambus benefits from a balanced and diverse portfolio of offerings across chips, silicon IP and patent licensing with each of them contributing at scale. From 2018 to 2021, product revenue sustained a 55% compound annual growth rate, making products the leading revenue source for the Company. Driven by the continued market momentum of our memory interface chips, we recognized record product revenue of $143.9 million in 2021. The Company achieved silicon IP growth through increasing design wins at leading system on chip ("SoC") customers with contributions from the businesses acquired in 2021. In addition, Rambus successfully closed key patent licensing agreements, solidifying our foundation of sustained cash generation and fueling investment in our product and technology roadmaps. Rambus continued its technology leadership with the launch of the CXL Memory Interconnect Initiative and development of solutions for next-generation data centers.

Memory Interface Chips

Made for high speed, reliability and power efficiency, Rambus DDR memory interface chips for server memory modules (e.g., RDIMMs) enable increased bandwidth and expanded capacity in enterprise and cloud servers. The Rambus portfolio includes DDR5, DDR4 and DDR3 memory interface chips. Rambus offers the industry's fastest DDR5 Registering Clock Driver ("RCD"), providing the critical control signals and clock for operation of the memory module at top-of-the-line performance.

We sell memory interface chips directly and indirectly to memory module manufacturers and OEMs worldwide through multiple channels, including our direct sales force and distributors. We operate direct sales offices in the United States, France, Japan, South Korea, Taiwan and China, where we employ sales personnel who serve our direct customers and manage our channel partners.

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

Silicon IP

Rambus Silicon IP includes interface and security IP solutions that move and protect data in advanced applications. Our Interface IP solutions feature both high-speed memory and chip-to-chip interconnect technologies. With the acquisitions of AnalogX Inc. and PLDA Group, Rambus expanded its portfolio of physical interface ("PHY") and digital controller IP to offer industry-leading, integrated memory and interconnect subsystems. These silicon-proven solutions are critical to high-performance data center, networking, AI, Machine Learning ("ML") and automotive applications because they enable and optimize the transfer of data between chips and electronic devices.

We offer one of the industry's most comprehensive portfolios of security IP solutions, including crypto cores, hardware roots of trust, high-speed protocol engines and chip provisioning technologies. With the growing threat environment, hardware-based, embedded security solutions are mission-critical for protecting data center, AI, networking, IoT, automotive and government applications.

We sell Silicon IP solutions to leading chip makers worldwide for integration into their SoC and FPGA designs. Rambus Silicon IP is sold through our direct sales force operating out of offices in the United States, France, Japan, South Korea, Taiwan and China.

Patent Licenses

Our patented inventions are foundational to the semiconductor industry and are licensed to leading semiconductor and system companies around the world. Rambus continues to innovate and invent, thereby advancing semiconductor technology. With a broad worldwide portfolio of patents covering memory architecture, high-speed serial links and security, we enhance our value and relevance in our target markets and create a platform for investment in product development.

Our patent licenses enable our customers to use specified portions of our portfolio of patented inventions in the customer's own digital electronics products, systems or services. These 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 or variable, or a hybrid of fixed and variable royalty payments over certain periods ranging up to ten years. Leading semiconductor and electronic system companies such as AMD, Broadcom, Cisco, CXMT, Fujitsu, IBM, Kioxia, Marvell, Mediatek, Micron, Nanya, NVIDIA, Panasonic, Phison, Qualcomm, Renesas, Samsung, SK hynix, Socionext, STMicroelectronics, Western Digital, Winbond, and Xilinx have licensed our patents for use in their own products.

Competition

The semiconductor industry is intensely competitive and is characterized by rapid technological change, short product life cycles, cyclical market patterns, price erosion, increasing foreign and domestic competition and market consolidation. Rambus competes with product offerings from various companies depending upon the particular Rambus product line. In the market for memory interface chips, we compete with international semiconductor companies, including Renesas and Montage Technology. In the Silicon IP market, Rambus competes with the in-house design teams at our potential customers, as well as with third-party IP suppliers such as Cadence and Synopsys. Many of our competitors are larger and have better access to financial, technical, sales and marketing resources than we possess.

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

Research and Development

Building upon our foundation of core semiconductor technologies, our research priorities focus on innovation and patent development that enhance the value of our patent portfolio and differentiate our product offerings in the market. 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 intended markets.

To foster our research and development efforts, we assembled a team of highly-skilled inventors, engineers and scientists whose activities are focused on continually developing new innovations within our chosen technology fields, and thereby securing the IP rights and legal protections for these ground-breaking inventions. Using this foundation of innovation, our technical teams develop new semiconductor solutions that enable increased performance, greater power efficiency and increased levels of security, as well as other improvements and benefits. Our solution design and development process is a multi-disciplinary effort requiring expertise in multiple fields across all of our operational units.

A significant number of our scientists and engineers spend all or a portion of their time on research and development. For the years ended December 31, 2021, 2020 and 2019, research and development expenses were $135.7 million, $139.8 million and $156.8 million, respectively. We expect to continue to invest substantial funds in research and development activities. In addition, because our customer agreements often call for us to provide engineering support, a portion of our total engineering costs are allocated to the cost of contract and other revenue.

Human Capital Resources

As of December 31, 2021, we had 690 employees, of which approximately 39% were in the United States and 61% in other global regions. Additionally, approximately 69% of our employees were engineers with the remaining employees in sales, general and administrative positions. None of our employees are covered by collective bargaining agreements.

Throughout the ongoing COVID-19 pandemic, our primary focus has been on the safety and well-being of our employees and their families. Our global pandemic efforts include instituting a global employee assistance program while leveraging the advice and recommendations of infectious disease experts to establish proper safety standards. As the pandemic continues, the health and well-being of our workforce remains our top priority while we ensure productivity for those employees working from home.

We believe that our future success largely depends upon our continued ability to identify, attract, motivate and retain qualified personnel. We provide our employees with competitive compensation, as well as opportunities for equity ownership and developmental programs that enable continued learning and growth. We also offer employees benefits such as life and health insurance, paid time off, paid parental leave, and retirement savings plans. We utilize successful recruiting practices that yield qualified and dedicated employees who are driven to achieve our vision.

Recently, the employment market in the United States has been subject to a hyper-competitive compensation environment especially for technology companies in the San Francisco Bay Area and elsewhere. Our human capital resources objectives, as described above, help us retain and motivate our existing employees, advisors, and consultants, which is a key component of increasing stockholder value and the success of Rambus.

We are an equal opportunity employer and are committed to maintaining a diverse and inclusive work environment. Our commitment to diversity and inclusion helps us attract and retain the best talent, enables employees to realize their full potential and drives high performance through innovation and collaboration. Because we know that diversity is truly a competitive advantage that helps drive innovation, we strive to maintain a best-in-class work environment that fosters respect for individuals, their ideas and contributions. We benefit from the innovation that results when people with differing experiences, perspectives and cultures work together to achieve a common goal.

Intellectual Property

We maintain and support an active program to protect our IP, primarily through the filing of patent applications and the defense of issued patents against potential infringement. As of December 31, 2021, our technologies are covered by 2,380 U.S. and foreign patents, having expiration dates ranging from 2022 to 2040. Additionally, we have 603 patent applications pending. Some of the patents and pending patent applications are derived from a common parent patent application or are foreign counterpart patent applications. We believe our patented innovations provide our customers with the legal rights and licenses to use our inventions to achieve improved performance, greater cost-effectiveness and other technological benefits in their own products and services. We intend to continue our innovation efforts and allocate significant investment in our IP development programs.

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

Backlog

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

Corporate and Available Information

Rambus Inc. was founded in 1990 and reincorporated in Delaware in March 1997. Our principal executive offices are located at 4453 North First Street, Suite 100, San Jose, California. Our website is *www.rambus.com*. We have used, and intend to continue to use, our investor relations website as a means of disclosing material non-public information and for complying with our disclosure obligations under Regulation FD. The inclusion of our website address in this report does not include or incorporate by reference into this report any information on our website. You can obtain copies of our Forms 10-K, 10-Q, 8-K, and other filings with the SEC, and all amendments to these filings, free of charge, from our website as soon as reasonably practicable following our filing of any of these reports with the SEC. In addition, you may read and copy any material we file with the SEC at the SEC's Public Reference Room at 100 F Street NE, Room 1580, Washington, D.C. 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains a website that contains reports, proxy, and information statements, and other information regarding registrants that file electronically with the SEC at *www.sec.gov*. Further, the Company's references to the URLs for these websites are intended to be inactive textual references only.

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

Our Executive Officers

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

Name	Age	Position and Business Experience
Luc Seraphin	58	Mr. Seraphin is President & Chief Executive Officer. With over 30 years of experience managing global businesses, Mr. Seraphin brings the overall vision and leadership necessary to drive future growth for the company. Prior to this role, Mr. Seraphin was the Senior Vice President and General Manager of the Memory and Interface Division, leading the development of the company's innovative memory architectures and high-speed serial link solutions. Mr. Seraphin also served as the Senior Vice President of Worldwide Sales and Operations where he oversaw sales, business development, customer support and operations across the various business units within Rambus. Mr. Seraphin started his career as a field application engineer at NEC and later joined AT&T Bell Labs, which became Lucent Technologies and Agere Systems (now Broadcom Inc.). During his 18 years at Agere, Mr. Seraphin held several senior positions in sales, marketing and general management, culminating in his last position as Executive Vice President and General Manager of the Wireless Business Unit. Following this, Mr. Seraphin held the position of General Manager of a GPS startup company in Switzerland and was Vice President of Worldwide Sales and Support at Sequans Communications. During his career, Mr. Seraphin has advised and supported companies in both the product and IP markets. Mr. Seraphin holds a bachelor's degree in Mathematics and Physics and a master's degree in Electrical Engineering from Ecole Superieure de Chimie, Physique, Electronique, based in Lyon, France where he majored in Computer Architecture. Mr. Seraphin also holds an MBA from the University of Hartford and has completed the senior executive program of Columbia University.
Keith Jones	50	Vice President Finance and Interim Chief Financial Officer. Mr. Jones has served as the Interim Chief Financial Officer since November 2021, prior to which date Mr. Jones served as Chief Accounting Officer, Corporate Controller and Vice President of Finance. Mr. Jones joined Rambus in February 2018. Prior to Rambus, he served as the World-Wide Corporate Controller, Vice President of Finance and the Principal Accounting Officer at ShoreTel Inc., prior to its acquisition by Mitel Networks Corporation. At ShoreTel, Keith oversaw the reporting, controls and treasury-related activities of the company. Prior to that, he served as the Chief Financial Officer and Vice President of Finance at PDF Solutions, Inc. overseeing the overall financial management of the company, including planning, tax, treasury, controls, reporting and merger and acquisition-related activity. Mr. Jones has held numerous senior leadership positions at various technology companies including Interwoven and e-Time Capital and started his career as an Audit Manager with Deloitte and Touche. Mr. Jones holds a Bachelor of Science in Business Administration with an emphasis in Accounting from California State University, Fresno.
Sean Fan	56	Senior Vice President, Chief Operating Officer. Mr. Fan has served as the Senior Vice President, Chief Operating Officer since August 2019. Prior to Rambus from March 2019 to June 2019, he served as Vice President and General Manager at Renesas Electronics Corporation, responsible for the datacenter business unit, a premier supplier of advanced semiconductor solutions. Prior to his role at Renesas, Mr. Fan was Senior Vice President and Corporate General Manager of the Computing and Communications Group at Integrated Device Technology, Inc. ("IDT"), a leading supplier of analog mixed-signal products including sensors, connectivity and wireless power, from May 2017 until March 2019 when IDT was acquired by Renesas Electronics Corporation. Mr. Fan joined IDT in 1999 and held various management roles at IDT, including Vice President and General Manager of the Computing and Communications Division, Vice President and General Manager of the Interface Connectivity Division, Vice President of China Operations, Vice President and General Manager of the Memory Interface Division, General Manager of Standard Product Operations, and Senior Director of Silicon Timing Solutions. Prior to joining IDT, Mr. Fan served in various engineering and management roles with Lucent Microelectronics, Mitel Semiconductor, and the National Lab of Telecom Research in China.
John Shinn	53	Senior Vice President, General Counsel, Corporate Secretary and Chief Compliance Officer. Mr. Shinn has served as the Senior Vice President, General Counsel, Corporate Secretary and Chief Compliance Officer since February 2021 and as our Vice President, Deputy General Counsel since October 2016. Prior to Rambus, Mr. Shinn was Vice President and General Counsel at Toptal, LLC, a global remote company that provides a freelancing platform, connecting businesses with software engineers, designers, finance experts, product managers, and project managers, from February 2016 until October 2016, where he was responsible for all aspects of the corporate legal function, including corporate governance, regulatory compliance, commercial transactions, intellectual property matters and employment law. From February 2015 to January 2016, Mr. Shinn served as the Vice President of Legal at Tanium, Inc., an enterprise software company at the forefront of security and systems management, where he was responsible for all aspects of the company legal function, including commercial licensing, partnership and vendor contracts, new hire and employment matters, sales compensation plan design and corporate legal matters. Prior to February 2015, Mr. Shinn held the Sr. Director of Legal, Commercial Transactions at Brocade Communication Systems, Inc. Mr. Shinn has also worked in private practice with the law firm of Wilson Sonsini Goodrich & Rosati, advising high tech and emerging growth companies on technology transactions and mergers and acquisitions. Mr. Shinn began his legal career as a litigation attorney with a boutique intellectual property and

securities litigation law firm in San Jose. Mr. Shinn is a member of the State Bar of California and received his J.D. from Santa Clara University and his bachelor’s degree in American and European History from Stanford University.

Item 1A. *Risk Factors*

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

Summary Risk Factors

Our business is subject to numerous risks and uncertainties that you should consider before investing in our company, as fully described below. The principal factors and uncertainties that make investing in our company risky include, among others:

- We have traditionally operated in, and may enter other, industries that are highly cyclical and competitive.
- Our revenue is concentrated in a few customers, and if we lose any of these customers through contract terminations or acquisitions, our revenue may decrease substantially.
- Some of our revenue is subject to the pricing policies of our customers over which we have no control.
- Our customers often require our products to undergo a lengthy and expensive qualification process which does not assure product sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, our business and operating results would suffer.
- We may not be able to enhance our existing products and develop new products in a timely manner.
- Our future revenue depends in meaningful part on sustaining or growing our licensing revenue and the failure to achieve such revenue would lead to a material decline in our results of operations.
- Our licensing cycle is lengthy and costly, and our marketing and licensing efforts may be unsuccessful.
- Some of our license agreements may convert to fully paid-up licenses at the expiration of their terms, or upon certain milestones, and we may not receive royalties after that time.
- Future revenue is difficult to predict for several reasons, and our failure to predict revenue accurately may result in our stock price declining.
- We may fail to meet our publicly announced guidance or other expectations about our business, which would likely cause our stock price to decline.
- A substantial portion of our revenue is derived from sources outside of the United States and this revenue and our business generally are subject to risks related to international operations that are often beyond our control.
- Weak global economic conditions may adversely affect demand for the products and services of our customers.
- We may have to invest more resources in research and development than anticipated, which could increase our operating expenses and negatively impact our operating results.
- Any failure in our delivery of high-quality technical support services may adversely affect our relationships with our customers and our financial results.
- Our operations are subject to the effects of a rising rate of inflation.
- We rely on third parties for a variety of services, including manufacturing, and these third parties' failure to perform these services adequately or change the allocation of their services/capacity due to industry or other pressures could materially and adversely affect our business.
- We rely on a number of third-party providers for data center hosting facilities, equipment, maintenance and other services, and the loss of, or problems with, one or more of these providers may impede our growth or cause us to lose customers.
- We face risks related to the ongoing COVID-19 pandemic and subsequent variants, which could significantly disrupt our research and development, operations, sales and financial results.
- Our business and operations could suffer in the event of physical and cyber security breaches and incidents.
- Failures in our products and services or in the products of our customers, including those resulting from security vulnerabilities, defects, bugs or errors, could harm our business.
- We have in the past made and may in the future make acquisitions or enter into mergers, strategic investments, sales of assets, divestitures or other arrangements that may not produce expected operating and financial results.
- If we are unable to attract and retain qualified personnel globally, especially in light of a hyper-competitive compensation environment, our business and operations could suffer.
- Our operations are subject to risks of natural disasters, acts of war, terrorism, widespread illness or security breaches or incidents at our domestic and international locations, any one of which could result in a business stoppage and negatively affect our operating results.
- In the future, we may fail to maintain an effective system of internal control over financial reporting or adequate disclosure controls and procedures, which may result in material misstatements of our consolidated financial statements or cause us to fail to meet our periodic reporting obligations.
- Unanticipated changes in our tax rates or in the tax laws, treaties and regulations could expose us to additional income tax liabilities, which could affect our operating results and financial condition.

- We are subject to various government restrictions and regulations, including on the sale of products and services that use encryption technology and those related to privacy and other consumer protection matters.
- Litigation and government proceedings could affect our business in materially negative ways.
- If we are unable to protect our inventions successfully through the issuance and enforcement of patents, our operating results could be adversely affected.
- Third parties may claim that our products or services infringe on their intellectual property rights, exposing us to litigation that, regardless of merit, may be costly to defend.
- Warranty, service level agreement and product liability claims brought against us could cause us to incur significant costs and adversely affect our operating results, as well as our reputation and relationships with customers.
- The price of our common stock may continue to fluctuate.
- We are leveraged financially, which could adversely affect our ability to adjust our business to respond to competitive pressures and to obtain sufficient funds to satisfy our future research and development needs, to protect and enforce our intellectual property, and to meet other needs.
- Compliance with changing regulation of corporate governance and public disclosure may result in additional expenses.
- Our certificate of incorporation and bylaws, Delaware law, our outstanding convertible notes and certain other agreements contain provisions that could discourage transactions resulting in a change in control, which may negatively affect the market price of our common stock.

Risks Associated with Our Business, Industry and Market Conditions

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

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

We face competition from semiconductor and digital electronics products and systems companies, and other semiconductor IP companies that provide security cores that are available to the market. We believe some of the competition for our technologies may come from our prospective customers, some of which are internally evaluating and developing products based on technologies that they contend or may contend will not require a license from us. Many of these companies are larger and may have better access to financial, technical and other resources than we possess.

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

In addition, our efforts to expand into new markets subject us to additional risks. We may have limited or no experience in new products and markets, and our customers may not adopt our new offerings. These and other new offerings may present new and difficult challenges, which could negatively affect our operating results.

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

We have a high degree of revenue concentration. Our top five customers for each reporting period represented approximately 56%, 46% and 45% of our revenue for the years ended December 31, 2021, 2020 and 2019, respectively. For 2021, revenue from Micron, Samsung and SK hynix each accounted for 10% or more of our total revenue. For 2020, revenue from Micron and SK hynix each accounted for 10% or more of our total revenue. For 2019, revenue from Broadcom and SK hynix each accounted for 10% or more of our total revenue. We expect to continue to experience significant revenue concentration for the foreseeable future.

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

We continue to negotiate with customers and prospective customers to enter into license agreements. Any future agreement may trigger our obligation to offer comparable terms or modifications to agreements with our existing customers, which may be less favorable to us than the existing license terms. We expect licensing fees will continue to vary based on our success in renewing existing license agreements and adding new customers, as well as the level of variation in our customers' reported shipment volumes, sales price and mix, offset in part by the proportion of customer payments that are fixed. In particular, under our license agreement with Samsung, the license fees payable by Samsung are subject to certain adjustments and conditions, and we therefore cannot provide assurances that the revenues generated by this license will not decline in the future. Further, the license agreement with Samsung is currently set to expire on September 30, 2023, and we cannot provide assurances that this license will be renewed. If we are unable to renew the Samsung license, then the licensing billings generated by the license will cease, and we will not recognize any revenue associated with a potential renewal. In addition, some of our material license agreements may contain rights by the customer to terminate for convenience, or upon certain other events, such as change of control, material breach, insolvency or bankruptcy proceedings. If we are unsuccessful in entering into license agreements with new customers or renewing license agreements with existing customers, on favorable terms or at all, or if they are terminated, our results of operations may decline significantly.

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

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

Our customers often require our products to undergo a lengthy and expensive qualification process which does not assure product sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, our business and operating results would suffer.

Prior to purchasing our products, our customers often require that our products undergo extensive qualification processes, which involve testing of our products in the customers' systems, as well as testing for reliability. This qualification process may continue for several months. However, qualification of a product by a customer does not assure any sales of the product to that customer. Even after successful qualification and sales of a product to a customer, a subsequent revision in third-party manufacturing processes may require a new qualification process with our customers, which may result in delays and in our holding excess or obsolete inventory. After our products are qualified, it can take several months or more before the customer commences volume production of components or systems that incorporate our products. Despite these uncertainties, we devote substantial resources, including design, engineering, sales, marketing and management efforts, to qualify our products with customers in anticipation of sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, sales of those products to the customer may be precluded or delayed, which may impede our growth and cause our business to suffer.

We may not be able to enhance our existing products and develop new products in a timely manner.

Our future operating results will depend to a significant extent on our ability to continue to offer products that compare favorably with alternative solutions on the basis of time to introduction, cost, performance, and end user preferences. Our product offerings may present new and difficult challenges, and we may be subject to claims if customers of our offerings experience delays, failures, non-performance or other quality issues. In particular, we may experience difficulties with product design, qualification, manufacturing, including supply chain shortages that might lead to an inability to meet customer demand, marketing or certification that could delay or prevent our development, introduction or marketing and sales of products. Although we intend to design our products to be fully compliant with applicable industry standards, proprietary enhancements may not in the future result in full conformance with existing industry standards under all circumstances.

Further, our business model continues to transform towards greater reliance on product revenue. In particular, we are relying on our memory interface chips to result in significant growth in fiscal 2022. If sales of our memory interface chips do not grow as anticipated, then our business could suffer as a result.

Our future revenue depends in meaningful part on sustaining or growing our licensing revenue and the failure to achieve such revenue would lead to a material decline in our results of operations.

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

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

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

Some of our license agreements may convert to fully paid-up licenses at the expiration of their terms, or upon certain milestones, and we may not receive royalties after that time.

From time to time, we enter into license agreements that automatically convert to fully paid-up licenses upon expiration or upon reaching certain milestones. We may not receive further royalties from customers for any licensed technology under those agreements if they convert to fully paid-up licenses because such customers will be entitled to continue using some, if not all, of the relevant intellectual property (“IP”) or technology under the terms of the license agreements without further payment, even if relevant patents or technologies are still in effect. If we cannot find another source of royalties to replace the royalties from these license agreements converting to fully paid-up licenses, our results of operations following such conversion could be adversely affected.

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

As we commercially launch each of our products, the sales volume of and resulting revenue from such products in any given period will be difficult to predict. Our lengthy license negotiation cycles could make a considerable portion of our future revenue difficult to predict because we may not be successful in entering into or renewing licenses with our customers on our anticipated timelines.

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

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

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

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

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

For the years ended December 31, 2021, 2020 and 2019, revenues received from our international customers constituted approximately 36%, 44% and 41%, respectively, of our total revenue. We expect that future revenue derived from international sources will continue to represent a significant portion of our total revenue.

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

Trade-related government actions, whether implemented by the U.S. government, China or other countries, that impose barriers or restrictions that would impact our ability to sell or ship products to certain customers may have a negative impact on our financial condition and results of operations. We cannot predict the actions government entities may take in this context and may be unable to quickly offset or effectively react to government actions that restrict our ability to sell to certain customers or in certain jurisdictions. Government actions that affect our customers' ability to sell products or access critical elements of their supply chains may result in a decreased demand for their products, which may consequently reduce their demand for our products.

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

- hiring, maintaining and managing a workforce and facilities remotely and under various legal systems, including compliance with local labor and employment laws;
- non-compliance with our code of conduct or other corporate policies;
- natural disasters, acts of war, terrorism, widespread global pandemics or illness, such as COVID-19 and its variants, or security breaches or incidents;
- export controls, tariffs, import and licensing restrictions, climate-change regulations and other trade barriers;
- profits, if any, earned abroad being subject to local tax laws and not being repatriated to the United States or, if repatriation is possible, limited in amount;
- adverse tax treatment of revenue from international sources and changes to tax codes, including being subject to foreign tax laws and being liable for paying withholding, income or other taxes in foreign jurisdictions;
- unanticipated changes in foreign government laws and regulations;
- increased financial accounting and reporting burdens and complexities;
- lack of protection of our IP and other contract rights by jurisdictions in which we may do business to the same extent as the laws of the United States;
- potential vulnerability to computer system, internet or other systemic attacks, such as denial of service, viruses or other malware which may be caused by criminals, terrorists or other sophisticated organizations;
- social, political and economic instability;
- geopolitical issues, including changes in diplomatic and trade relationships, in particular with China; and
- cultural differences in the conduct of business both with customers and in conducting business in our international facilities and international sales offices.

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

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

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

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

If new competitors, technological advances by existing competitors, and/or development of new technologies in the digital electronics or semiconductor industries or other competitive factors require us to invest significantly greater resources than anticipated in our research and development efforts, our operating expenses could increase. If we are required to invest significantly greater resources than anticipated in research and development efforts without an increase in revenue, our operating results would decline. We expect these expenses to increase in the foreseeable future as our technology development efforts continue. Additionally, there can be no guarantee that our research and development investments will result in products that create additional revenue.

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

In addition, new products that we develop may not adequately address the changing needs of the marketplace. The new products that we develop may contain undetected errors, defects, or vulnerabilities. The occurrence of any defects or errors in our products could result in lost or delayed market acceptance and sales of our products, delays in payment by customers, loss of customers or market share, product returns, damage to our reputation, diversion of our resources, increased service and warranty expenses or financial concessions, increased insurance costs and potential liability for damages.

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

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

Our operations are subject to the effects of a rising rate of inflation.

The United States has recently experienced historically high levels of inflation. According to the U.S. Department of Labor, the annual inflation rate for the United States was approximately 7.0% for the 12 months ended December 31, 2021. If the inflation rate continues to increase, such as increases in the costs of labor and supplies, it will affect our expenses, such as employee compensation and research and development charges. Research and development expenses account for a significant portion of our operating expenses. Additionally, the United States is experiencing an acute workforce shortage, which in turn, has created a hyper-competitive wage environment that may increase the Company’s operating costs. To the extent inflation results in rising interest rates and has other adverse effects on the market, it may adversely affect our consolidated financial condition and results of operations.

Risks Associated with Our Supply and Third Party Manufacturing

We rely on third parties for a variety of services, including manufacturing, and these third parties’ failure to perform these services adequately or change the allocation of their services/capacity due to industry or other pressures could materially and adversely affect our business.

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

Semiconductor supply chain disruptions have been well publicized recently given high demand and lower supply. We believe that we will continue to experience various supply constraints related to our memory interface chip business in the near term. In particular, to the extent we do not have sufficient wafer and packaging substrate firm commitments from our third-party suppliers, we may not obtain the materials needed on our desired timelines or at reasonable prices. Large swings in demand may exceed our contracted supply and/or our suppliers' capacity to meet those demand changes resulting in a shortage of parts, materials, or capacity needed to manufacture our products. While we continually work with our suppliers to mitigate the impact of the supply constraints to our customer deliveries, in the event of a shortage or supply interruption from suppliers of related components, we may not be able to develop alternate sources quickly, cost-effectively, or at all. An extended period of global supply chain and economic disruption as a result of the COVID-19 pandemic could have a material negative impact on our business, results of operations, access to sources of liquidity and financial condition, though the full extent and duration is uncertain. Additionally, various sources of supply-chain risk, including strikes or shutdowns at delivery ports or loss of or damage to our products while they are in transit or storage, intellectual property theft, losses due to tampering, third-party vendor issues with quality or sourcing control, failure by our suppliers to comply with applicable laws and regulations, potential tariffs or other trade restrictions, or other similar problems could limit or delay the supply of our products or harm our reputation. Any interruption or delay in manufacturing or component supply, any increases in manufacturing or component costs, or the inability to obtain these services or components from alternate sources at acceptable prices and within a reasonable amount of time would harm our ability to provide our products to customers on a timely basis. This could harm our relationships with our customers, prevent us from acquiring new customers, and materially and adversely affect our business.

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

We rely on third-party providers to supply data center hosting facilities, equipment, maintenance and other services in order to enable us to provide some of our services, and have entered into various agreements for such services. The continuous availability of our services depends on the operations of those facilities, on a variety of network service providers and on third-party vendors. In addition, we depend on our third-party facility providers' ability to protect these facilities against damage or interruption from natural disasters, power or telecommunications failures, criminal acts, cyber-attacks and similar events. If there are any lapses of service or damage to a facility, we could experience lengthy interruptions in our service, as well as delays and additional expenses in arranging new facilities and services. Even with current and planned disaster recovery arrangements, our business could be harmed. Any interruptions or delays in our service, whether as a result of third-party error, our own error, natural disasters, criminal acts, security breaches or other causes, whether accidental or willful, could harm our relationships with customers, harm our reputation and cause our revenue to decrease and/or our expenses to increase. Also, in the event of damage or interruption, our insurance policies may not adequately compensate us for any losses that we may incur. These factors in turn could further reduce our revenue, subject us to liability and cause us to issue credits or cause us to lose customers, any of which could materially adversely affect our business.

Certain software that we use in certain of our products is licensed from third parties and, for that reason, may not be available to us in the future, which has the potential to delay product development and production or cause us to incur additional expense, which could materially adversely affect our business, financial condition, operating results and cash flow.

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

Risks Associated with Our Business Operations

We face risks related to the ongoing COVID-19 pandemic and subsequent variants, which could significantly disrupt our research and development, operations, sales and financial results.

Our business may continue to be adversely impacted by the effects of the ongoing COVID-19 pandemic and subsequent variants that continue to spread through the world and has adversely impacted global commercial activity. In addition to global macroeconomic effects, the ongoing COVID-19 pandemic has caused minor disruption to our domestic and international operations and sales activities. Our third-party manufacturers, suppliers, third-party distributors, sub-contractors and customers have been and will continue to be disrupted by worker absenteeism, quarantines and restrictions on our employees' ability to work, office and factory closures, disruptions to ports and other shipping infrastructure, border closures, or other travel or health-related restrictions. The spread of COVID-19 has caused us to modify our business practices (including employee travel, mandatory work-from-home policies, vaccine mandates, and cancellation of physical participation in meetings, events, and conferences), and we may take further actions as required by government authorities and regulations or that we determine are in the best interests of our employees, customers, partners, and suppliers. Some regions are easing COVID-19 related restrictions; however, most of our employees continue to work remotely and we continue to temporarily prohibit most business travel. There is no certainty that such measures will be sufficient to mitigate the risks posed by the disease, and our ability to perform critical functions could be harmed. As our offices begin to reopen, we expect to incur incremental expenses as we resume onsite services and related in-office costs, which could adversely impact our results of operations.

Such restrictions may also impact the ability of our employees to perform their jobs and our ability to develop and design our products in a timely manner or meet required milestones or customer commitments. Depending on the magnitude of such effects on the operations of our suppliers, third-party distributors, or sub-contractors, our supply chain and product shipments may be delayed, which could adversely affect our business, operations and customer relationships.

Further, we rely on third-party suppliers and manufacturers throughout the globe. The ongoing COVID-19 pandemic has resulted in the extended shutdown of certain businesses and the closure of international borders throughout the world, which may result in disruptions to our supply chain and critical logistics providers. These may include disruptions from temporary closure of third-party supplier and manufacturer facilities, interruptions in product supply or restrictions on the export or shipment of our products, as well as the import of products into countries in which we operate. Although we have attempted to minimize the effects of these disruptions, it is possible that these attempts will be insufficient and that these disruptions will likely have an adverse effect on our revenues and operating results.

In some regions, markets, or industries where COVID-19 and its variants have driven an increase in sales for our products, the demand may not be sustainable if conditions change. The reopening of offices may also generate demand for our products that may be temporary. Additionally, stronger demand globally has limited the availability of capacity and components in our supply chain, which could cause us to order an excess amount if demand changes, pay higher prices, or limit our ability to obtain supply at necessary levels or at all. As the COVID-19 pandemic continues, the timing and overall demand from customers and the availability of supply chain, logistical services, component supply and increases in inflation rates may have a material net negative impact on our business and financial results.

In addition, the ongoing COVID-19 pandemic or other disease outbreak may continue to adversely affect the economies and financial markets of many countries, resulting in an economic downturn that may impact overall technology spending, adversely affecting demand for our products and impacting our operating results. There can be no assurance that any decrease in sales resulting from the ongoing COVID-19 pandemic will be offset by increased sales in subsequent periods. Furthermore, such disruption in the global financial markets may reduce our ability to access capital or our customers' ability to pay us for past or future purchases, which could negatively affect our liquidity.

In addition, the ongoing COVID-19 pandemic continues to evolve rapidly, with localized surges in COVID-19 cases and the status of operations and government restrictions evolving weekly. Although the magnitude of the impact of the ongoing COVID-19 pandemic on our business and operations remains uncertain, the extent to which the outbreak impacts our business, financial condition, operating results and cash flows will depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the duration, severity and continued spread of the pandemic, the emergence and spread of new and more contagious or deadly variants or mutant strains of the COVID-19 virus that may render vaccines ineffective or decrease their efficacy, travel restrictions and social distancing in the United States and other countries, business closures or business disruptions, the duration, timing and severity of the impact on customer spending, and the effectiveness of actions taken in the United States and other countries to contain and treat the disease. We may also suffer from any of the foregoing disruptions if COVID-19 experiences a resurgence in any particular country or region in the future.

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

Attempts by others to gain unauthorized access to and disrupt our information technology systems are becoming more sophisticated. These attempts, which might be related to industrial or other espionage, may include covertly introducing malware to our computers and networks and impersonating authorized users, phishing attempts and other forms of social engineering, employee or contractor malfeasance, denial of service attacks and ransomware attacks, among others. We seek to detect and investigate all security incidents impacting our systems and to prevent their recurrence, but in some cases, we might be unaware of an incident or its magnitude and effects. We also utilize third-party service providers to host, transmit or otherwise process electronic data in connection with our business activities, including our supply chain processes, operations and communications. We and/or our third-party service providers have faced and may continue to face security threats and attacks from a variety of sources. Our data, corporate systems, third-party systems and security measures may be subject to breaches or intrusions due to the actions of outside parties, employee error, malfeasance, a combination of these, or otherwise, including social engineering and employee and contractor error or malfeasance, especially as certain of our employees engage in work from home arrangements because of the COVID-19 pandemic, and, as a result, an unauthorized party may obtain access to our systems, networks, or data, including IP and confidential business information of ourselves and our customers. There have been and may continue to be significant supply chain attacks, and we cannot guarantee that our or our third-party service providers' systems and networks have not been breached or that they do not contain exploitable defects or bugs that could result in a breach of or disruption to our systems and networks or the systems and networks of third parties that support us and our services. We and our service providers may face difficulties or delays in identifying or responding to any actual or perceived security breach or incident. While we have not identified any material incidents of unauthorized access to date, the theft or other unauthorized acquisition of, unauthorized use or publication of, or access to our IP and/or confidential business information could harm our competitive position and reputation, reduce the value of our investment in research and development and other strategic initiatives or otherwise adversely affect our business. In the event of any security breach or incident, including any breach or incident that results in inappropriate access to, or loss, corruption, unavailability, or unauthorized acquisition, disclosure or other processing of our or our customers' confidential information or any personally-identifiable information we or our third-party service providers maintain, including that of our employees, we could suffer a loss of intellectual property or loss of data, may be subject to claims, liability and proceedings, and may incur liability and otherwise suffer financial harm.

Any actual, alleged or perceived breach of security in our systems or networks, or any other actual, alleged or perceived data security incident we or our third-party service providers suffer, could result in damage to our reputation, negative publicity, loss of customers and sales, harm to our market position, increased costs to remedy any problems and otherwise respond to any incident, regulatory investigations and enforcement actions, claims, litigation, proceedings and other liability. In addition, we may incur significant costs and operational consequences of investigating, remediating, eliminating and putting in place additional tools and devices designed to prevent actual or perceived security breaches and other security incidents, as well as the costs to comply with any notification or other legal obligations resulting from any security incidents. Any of these negative outcomes could result in substantial costs and diversion of resources, distract management and technical personnel, adversely impact our sales and reputation and seriously harm our business or operating results.

Although we maintain insurance coverage that may cover certain liabilities in connection with some security breaches and other security incidents, we cannot be certain our insurance coverage will be adequate for liabilities actually incurred, that insurance will continue to be available to us on commercially reasonable terms (if at all) or that any insurer will not deny coverage as to any future claim. The successful assertion of one or more large claims against us that exceed available insurance coverage, the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, or denials of coverage, could have a material adverse effect on our business, including our financial condition, results of operations and reputation.

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

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

- expenditure of significant financial and research and development resources in efforts to analyze, correct, eliminate or work around breaches, errors, bugs or defects or to address and eliminate vulnerabilities;
- financial liability to customers for breach of certain contract provisions, including indemnification obligations;
- loss of existing or potential customers;
- product shipment restrictions or prohibitions to certain customers;
- delayed or lost revenue;

- delay or failure to attain market acceptance;
- negative publicity, which would harm our reputation; and
- litigation, regulatory inquiries or investigations that would be costly and harm our reputation.

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

We prepare our financial statements in accordance with accounting principles generally accepted in the United States and these principles are subject to interpretation by the SEC, the Financial Accounting Standards Board ("FASB") and various bodies formed to interpret and create appropriate accounting principles and guidance. A change in these principles or application guidance, or in their interpretations, may have a material effect on our reported results, as well as our processes and related controls, and may retroactively affect previously reported results. For instance, we adopted ASC 842, the New Leasing Standard, effective for us on January 1, 2019, using the alternative transition method and recognized a cumulative-effect adjustment to the opening balance of accumulated deficit on January 1, 2019. We also adopted ASC 606, the New Revenue Standard, effective for us on January 1, 2018, on a modified retrospective basis, with a cumulative-effect adjustment to the opening balance of accumulated deficit on January 1, 2018. The New Revenue Standard materially impacted the timing of revenue recognition for our fixed-fee IP licensing arrangements (including certain fixed-fee agreements that license our existing IP portfolio, as well as IP added to our portfolio during the license term) as a majority of such revenue would be recognized at inception of the license term (as opposed to over time as is the case under prior U.S. GAAP), and we are required to compute and recognize interest income over time for certain licensing arrangements as control over the IP generally transfers significantly in advance of cash being received from customers. The impact of the adoption of the New Revenue Standard did not have a material impact on our other revenue streams. We also have enhanced the form and content of some of our guidance metrics that we provide following implementation of the New Revenue Standard. We expect that any change to current revenue recognition practices may significantly increase volatility in our quarterly revenue, financial results and trends, and may impact our stock price.

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

From time to time, we engage in acquisitions, strategic transactions, strategic investments, divestitures and potential discussions with respect thereto. For example, in 2019, we acquired Northwest Logic and the Secure Silicon IP and Protocols business from Verimatrix, formerly Inside Secure. Further, we acquired AnalogX Inc. ("AnalogX") in July 2021 and PLDA Group ("PLDA") in August 2021. Many of our acquisitions or strategic investments entail a high degree of risk, including those involving new areas of technology and such investments may not become liquid for several years after the date of the investment, if at all. Our acquisitions or strategic investments may not provide the advantages that we anticipated or generate the financial returns we expect, including if we are unable to close any pending acquisitions. For example, for any pending or completed acquisitions, we may discover unidentified issues not discovered in due diligence, and we may be subject to regulatory approvals or liabilities that are not covered by indemnification protection or become subject to litigation.

Achieving the anticipated benefits of business acquisitions depends in part upon our ability to integrate the acquired businesses in an efficient and effective manner and achieve anticipated synergies, and we may not be successful in these efforts. The integration of companies that have previously operated independently is complex and time consuming and may result in significant challenges, including, among others: retaining key employees; successfully integrating new employees, facilities, products, processes, operations, business models and systems, technology, and sales and distribution channels; retaining customers and suppliers of the acquired business; minimizing the diversion of management's and other employees' attention from ongoing business matters; coordinating geographically separate organizations; consolidating research and development operations; consolidating corporate and administrative infrastructures; implementing controls, processes and policies appropriate for a public company at acquired companies that may have previously lacked such controls, processes and policies; and managing the increased scale, complexity and globalization of our business, operations and employee base. We do not currently foresee any significant risks in the operational integration of either AnalogX or PLDA.

Additional risks related to the AnalogX and PLDA acquisitions and other acquisitions or strategic investments include, but are not limited to:

- difficulty in combining the technology, products, or operations of the acquired business with our business;
- difficulty in integrating and retaining the acquired workforce, including key employees;
- diversion of capital and other resources, including management's attention;
- assumption of liabilities and incurring amortization expenses, impairment charges to goodwill or write-downs of acquired assets;
- integrating financial forecasting and controls, procedures and reporting cycles;

- coordinating and integrating operations in countries in which we have not previously operated;
- acquiring business challenges and risks, including, but not limited to, disputes with management and integrating international operations and joint ventures;
- difficulty in realizing a satisfactory return, if any return at all;
- difficulty in obtaining or inability to obtain governmental and regulatory consents and approvals, other approvals or financing;
- the potential impact of complying with governmental or other regulatory restrictions placed on an acquisition;
- the potential impact on our stock price and financial results if we are unable to obtain regulatory approval for an acquisition, are required to pay reverse breakup fees or are otherwise unable to close an acquisition;
- failure and costs associated with the failure to consummate a proposed acquisition or other strategic investment;
- legal proceedings initiated as a result of an acquisition or investment;
- the potential for our acquisitions to result in dilutive issuances of our equity securities;
- the potential variability of the amount and form of any performance-based consideration;
- uncertainties and time needed to realize the benefits of an acquisition or strategic investment, if at all;
- negative changes in general economic conditions in the regions or the industries in which we or our target operate;
- the need to determine an alternative strategy if an acquisition does not meet our expectations;
- potential failure of our due diligence processes to identify significant issues with the acquired assets or company; and
- impairment of relationships with, or loss of our or our target's employees, vendors and customers, as a result of our acquisition or investment.

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

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

We may have to incur debt or issue equity securities to pay for any future acquisitions, which debt could involve restrictive covenants or which equity security issuance could be dilutive to our existing stockholders. We may also use cash to pay for any future acquisitions which will reduce our cash balance.

From time to time, we may also divest certain assets. These divestitures or proposed divestitures may involve the loss of revenue and/or potential customers, and the market for the associated assets may dictate that we sell such assets for less than what we paid. In addition, in connection with any asset sales or divestitures, we may be required to provide certain representations, warranties and covenants to buyers. While we would seek to ensure the accuracy of such representations and warranties and fulfillment of any ongoing obligations, we may not be completely successful and consequently may be subject to claims by a purchaser of such assets.

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

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

If we are unable to attract and retain qualified personnel globally, especially in light of a hyper-competitive compensation environment, our business and operations could suffer.

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

All of our officers and other U.S. employees are at-will employees, which means they may terminate their employment relationship with us at any time, and their knowledge of our business and industry would be extremely difficult to replace. Any changes in our senior management team in particular, even in the ordinary course of business, may be disruptive to our business. For example, in October 2021, we announced the resignation of our chief financial officer and the appointment of our current chief accounting officer as interim chief financial officer, to be effective as of November 15, 2021. We are currently undergoing a search for a new chief financial officer and will likely hire a replacement in the near future. While we seek to manage these transitions carefully, including by establishing strong processes and procedures and succession planning, such changes may result in a loss of institutional knowledge and cause disruptions to our business. If our senior management team fails to work together effectively or execute our plans and strategies on a timely basis as a result of management turnover or otherwise, our business could be harmed.

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

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

Our business operations depend on our ability to maintain and protect our facilities, computer systems and personnel, which are primarily located in the San Francisco Bay Area in the United States, Canada, the Netherlands, France, Bulgaria, Taiwan and India. The San Francisco Bay Area is in close proximity to known earthquake fault zones and sites of recent historic wildfires. Our facilities and transportation for our employees are susceptible to damage from earthquakes and other natural disasters such as fires, floods, droughts, extreme temperatures, and similar events. Should a catastrophe disable our facilities, we do not have readily available alternative facilities from which we could conduct our business, so any resultant work stoppage could have a negative effect on our operating results. We also rely on our network infrastructure and technology systems for operational support and business activities which are subject to physical and cyber damage, and also susceptible to other related vulnerabilities common to networks and computer systems. Acts of terrorism, climate-change related risk, widespread illness, or global pandemics, including the COVID-19 pandemic, war and any event that causes failures or interruption in our network infrastructure and technology systems could have a negative effect at our international and domestic facilities and could harm our business, financial condition, and operating results.

We rely upon the accuracy of our customers' recordkeeping, and any inaccuracies or payment disputes for amounts owed to us under our licensing agreements may harm our results of operations.

Many of our license agreements require our customers to document the manufacture and sale of products that incorporate our technology and report this data to us on a quarterly basis. While licenses with such terms give us the right to audit books and records of our customers to verify this information, audits rarely are undertaken because they can be expensive, time consuming, and potentially detrimental to our ongoing business relationship with our customers. Therefore, we typically rely on the accuracy of the reports from customers without independently verifying the information in them. Our failure to audit our customers' books and records may result in our receiving more or less royalty revenue than we are entitled to under the terms of our license agreements. If we conduct royalty audits in the future, such audits may trigger disagreements over contract terms with our customers and such disagreements could hamper customer relations, divert the efforts and attention of our management from normal operations and impact our business operations and financial condition.

We are subject to increased inventory risks and costs because we build our products based on forecasts provided by customers before receiving purchase orders for the product.

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

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

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

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

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

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

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

In the future, we may fail to maintain an effective system of internal control over financial reporting or adequate disclosure controls and procedures, which may result in material misstatements of our consolidated financial statements or cause us to fail to meet our periodic reporting obligations.

If we are not able to comply with the requirements of the Sarbanes-Oxley Act or if we are unable to maintain effective internal control over financial reporting and disclosure controls and procedures, we may not be able to produce timely and accurate financial statements or guarantee that information required to be disclosed by us in the reports that we file with the SEC is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms. Any failure of our internal control over financial reporting or disclosure controls and procedures could result in material misstatements of our consolidated financial statements, which could cause our investors to lose confidence in our publicly reported information, cause the market price of our stock to decline, expose us to sanctions or investigations by the SEC or other regulatory authorities, or impact our results of operations.

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

We are subject to income taxes in both the United States and various foreign jurisdictions. Significant judgment is required in determining our worldwide provision for income taxes and, in the ordinary course of business, there are many transactions and calculations where the ultimate tax determination is uncertain. Our effective tax rate could be adversely affected by several factors, many of which are outside of our control, including changes in the mix of earnings and losses in countries with differing statutory tax rates, changes in the valuation of deferred tax assets and liabilities, changes in tax laws, rates, treaties and regulations or the interpretation of the same, changes to the financial accounting rules for income taxes, the outcome of current and future tax audits, examinations or administrative appeals and certain non-deductible expenses. Our tax determinations are regularly subject to audit by tax authorities and developments in those audits could adversely affect our income tax provision, and we are currently undergoing such audits of certain of our tax returns. Although we believe that our tax estimates are reasonable, the final determination of tax audits or tax disputes may be different from what is reflected in our historical income tax provisions, which could affect our operating results.

Recently, in the United States, the Biden administration proposed to increase the U.S. corporate income tax rate, increase U.S. taxation of international business operations and impose a global minimum tax. Many countries and organizations such as the Organization for Economic Cooperation and Development are also actively considering changes to existing tax laws or have proposed or enacted new laws that could increase our tax obligations in countries where we do business or cause us to change the way we operate our business. Any of these developments or changes in federal, state, or international tax laws or tax rulings could adversely affect our effective tax rate and our operating results.

Risks Associated with Litigation, Regulation and Our Intellectual Property

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

Various countries have adopted controls, license requirements and restrictions on the export, import and use of products or services that contain encryption technology. In addition, governmental agencies have proposed additional requirements for encryption technology, such as requiring the escrow and governmental recovery of private encryption keys. Restrictions on the sale or distribution of products or services containing encryption technology may impact our ability to license data security technologies to the manufacturers and providers of such products and services in certain markets or may require us or our customers to make changes to the licensed data security technology that is embedded in such products to comply with such restrictions. Government restrictions, or changes to the products or services of our customers to comply with such restrictions, could delay or prevent the acceptance and use of such customers' products and services. In addition, the United States and other countries have imposed export controls that prohibit the export of encryption technology to certain countries, entities and individuals. Our failure to comply with export and use regulations concerning encryption technology could subject us to sanctions and penalties, including fines, and suspension or revocation of export or import privileges. Additionally, climate change concerns and the potential resulting environmental impact may result in new environmental, health, and safety laws and regulations that may affect us, our suppliers, and our customers. Such laws or regulations could cause us to incur additional direct costs for compliance, as well as increased indirect costs resulting from our customers, suppliers, or both incurring additional compliance costs that are passed on to us. These costs may adversely impact our results of operations and financial condition.

We are subject to a variety of laws and regulations in the United States, the European Union and other countries that involve, for example, user privacy, data protection and security, content and consumer protection. A number of proposals are pending before federal, state, and foreign legislative and regulatory bodies that could significantly affect our business. For example, in 2016, a new EU data protection regime, the General Data Protection Regulation ("GDPR") was adopted, with it fully effective on May 25, 2018, and California enacted the California Consumer Privacy Act as of January 1, 2020 ("CCPA"). Moreover, a new privacy law, the California Privacy Rights Act ("CPRA"), was approved by California voters in November 2020. The CPRA significantly modifies the CCPA when it becomes effective in most material respects on January 1, 2023. Further, on March 2, 2021, Virginia enacted the Virginia Consumer Data Protection Act ("CDPA"), which takes effect January 1, 2023, and on July 7, 2021, Colorado enacted the Colorado Privacy Act ("CPA"), which takes effect July 1, 2023. The CDPA and CPA are comprehensive privacy statutes that share similarities with the CCPA, CPRA and legislation proposed in other states. The GDPR and CCPA, and new and evolving laws such as the CPRA, CDPA, CPA and other future changes in laws or regulations relating to privacy, data protection and information security may require us to modify our existing practices with respect to the collection, use and disclosure of data. In particular, the GDPR provides for significant penalties in the case of non-compliance of up to €20 million or four percent of worldwide annual revenues, whichever is greater. The GDPR, CCPA, CPRA, CDPA, CPA and other existing and proposed laws and regulations can be costly to comply with and can delay or impede the development of new products, result in negative publicity, increase our operating costs and subject us to claims or other remedies.

In accordance with the Dodd-Frank Wall Street Reform and Consumer Protection Act, the SEC established new disclosure and reporting requirements for those companies that use “conflict” minerals mined from the Democratic Republic of Congo and adjoining countries in their products, whether or not these products are manufactured by third parties. These requirements could affect the sourcing and availability of minerals that are used in the manufacture of our products. We have to date incurred costs and expect to incur significant additional costs associated with complying with the disclosure requirements, including for example, due diligence in regard to the sources of any conflict minerals used in our products, in addition to the cost of remediation and other changes to products, processes, or sources of supply as a consequence of such verification activities. Additionally, we may face reputational challenges with our customers and other stakeholders if we are unable to sufficiently verify the origins of all minerals used in our products through the due diligence procedures that we implement. We may also face challenges with government regulators and our customers and suppliers if we are unable to sufficiently verify that the metals used in our products are conflict free.

Litigation and government proceedings could affect our business in materially negative ways.

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

We have in the past, and may in the future, become engaged in litigation stemming from our efforts to protect and enforce our patents and intellectual property and make other claims, which could adversely affect our intellectual property rights, distract our management and cause substantial expenses and declines in our revenue and stock price.

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

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

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

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

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

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

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

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

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

- any current or future U.S. or foreign patent applications will be approved and not be challenged by third parties;
- our issued patents will protect our IP and not be challenged by third parties;
- the validity of our patents will be upheld;
- our patents will not be declared unenforceable;
- the patents of others will not have an adverse effect on our ability to do business;
- Congress or the U.S. courts or foreign countries will not change the nature or scope of rights afforded patents or patent owners or alter in an adverse way the process for seeking or enforcing patents;
- changes in law will not be implemented, or changes in interpretation of such laws will occur, that will affect our ability to protect and enforce our patents and other IP;
- new legal theories and strategies utilized by our competitors will not be successful;
- others will not independently develop similar or competing chip interfaces or design around any patents that may be issued to us; or
- factors such as difficulty in obtaining cooperation from inventors, pre-existing challenges or litigation, or license or other contract issues will not present additional challenges in securing protection with respect to patents and other IP that we acquire.

If any of the above were to occur, our operating results could be adversely affected.

Furthermore, patent reform legislation, such as the Leahy-Smith America Invents Act, could increase the uncertainties and costs surrounding the prosecution of any patent applications and the enforcement or defense of our licensed patents. The federal courts, the USPTO, the Federal Trade Commission, and the U.S. International Trade Commission have also recently taken certain actions and issued rulings that have been viewed as unfavorable to patentees. While we cannot predict what form any new patent reform laws or regulations may ultimately take, or what impact recent or future reforms may have on our business, any laws or regulations that restrict or negatively impact our ability to enforce our patent rights against third parties could have a material adverse effect on our business.

In addition, our patents will continue to expire according to their terms, with expected expiration dates ranging from 2022 to 2040. Our failure to continuously develop or acquire successful innovations and obtain patents on those innovations could significantly harm our business, financial condition, results of operations, or cash flows.

Our inability to protect and own the intellectual property we create would cause our business to suffer.

We rely primarily on a combination of license, development and nondisclosure agreements, trademark, trade secret and copyright law and contractual provisions to protect our non-patentable IP rights. If we fail to protect these IP rights, our customers and others may seek to use our technology without the payment of license fees and royalties, which could weaken our competitive position, reduce our operating results and increase the likelihood of costly litigation. The growth of our business depends in part on the use of our IP in the products of third-party manufacturers, and our ability to enforce IP rights against them to obtain appropriate compensation. In addition, effective trade secret protection may be unavailable or limited in certain foreign countries. Although we intend to protect our rights vigorously, if we fail to do so, our business will suffer.

Effective protection of trademarks, copyrights, domain names, patent rights, and other IP rights is expensive and difficult to maintain, both in terms of application and maintenance costs, as well as the costs of defending and enforcing those rights. The efforts we have taken to protect our IP rights may not be sufficient or effective. Our IP rights may be infringed, misappropriated, or challenged, which could result in them being narrowed in scope or declared invalid or unenforceable. In addition, the laws or practices of certain countries do not protect our proprietary rights to the same extent as do the laws of the United States. Significant impairments of our IP rights, and limitations on our ability to assert our IP rights against others, could have a material and adverse effect on our business.

Third parties may claim that our products or services infringe on their intellectual property rights, exposing us to litigation that, regardless of merit, may be costly to defend.

Our success and ability to compete are also dependent upon our ability to operate without infringing upon the patent, trademark and other IP rights of others. Third parties may claim that our current or future products or services infringe upon their IP rights. Any such claim, with or without merit, could be time consuming, divert management's attention from our business operations and result in significant expenses. We cannot assure you that we would be successful in defending against any such claims. In addition, parties making these claims may be able to obtain injunctive or other equitable relief affecting our ability to license the products that incorporate the challenged IP. As a result of such claims, we may be required to obtain licenses from third parties, develop alternative technology or redesign our products. We cannot be sure that such licenses would be available on terms acceptable to us, if at all. If a successful claim is made against us and we are unable to develop or license alternative technology, our business, financial condition, operating results and cash flows could be materially adversely affected.

Any dispute regarding our intellectual property may require us to indemnify certain customers, the cost of which could severely hamper our business operations and financial condition.

In any potential dispute involving our patents or other IP, our customers could also become the target of litigation. While we generally do not indemnify our customers, some of our agreements provide for indemnification, and some require us to provide technical support and information to a customer that is involved in litigation involving use of our technology. In addition, we may be exposed to indemnification obligations, risks and liabilities that were unknown at the time that we acquired assets or businesses for our operations. Any of these indemnification and support obligations could result in substantial and material expenses. In addition to the time and expense required for us to indemnify or supply such support to our customers, a customer's development, marketing and sales of licensed semiconductors, mobile communications and data security technologies could be severely disrupted or shut down as a result of litigation, which in turn could severely hamper our business operations and financial condition as a result of lower or no royalty payments.

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

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

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

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

Participation in standards setting organizations may subject us to IP licensing requirements or limitations that could adversely affect our business and prospects.

In the course of our participation in the development of emerging standards for some of our present and future products, we may be obligated to grant to all other participants a license to our patents that are essential to the practice of those standards on reasonable and non-discriminatory, or RAND, terms. If we fail to limit to whom we license our patents, or fail to limit the terms of any such licenses, we may be required to license our patents or other IP to others in the future, which could limit the effectiveness of our patents against competitors.

Risks Associated with Capitalization Matters and Indebtedness

The price of our common stock may continue to fluctuate.

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

- any progress, or lack of progress, real or perceived, in the development of products that incorporate our innovations and technology companies' acceptance of our products, including the results of our efforts to expand into new target markets;
- our signing or not signing new licenses or renewing existing licenses, and the loss of strategic relationships with any customer;
- announcements of technological innovations or new products by us, our customers or our competitors;
- changes in our strategies, including changes in our licensing focus and/or acquisitions or dispositions of companies or businesses with business models or target markets different from our core;
- positive or negative reports by securities analysts as to our expected financial results and business developments;
- developments with respect to patents or proprietary rights and other events or factors;
- new litigation and the unpredictability of litigation results or settlements;
- repurchases of our common stock on the open market;
- issuance of additional securities by us, including in acquisitions, or large cash payments, including in acquisitions; and
- changes in accounting pronouncements, including the effects of ASC 606 and ASC 842.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Item 1B. *Unresolved Staff Comments*

None.

Item 2. *Properties*

As of December 31, 2021, we occupied offices in the leased facilities described below:

Number of Offices Under Lease	Location	Primary Use
4	United States	
	San Jose, CA (Corporate Headquarters)	Executive and administrative offices, research and development, sales and marketing and service functions
	Agoura Hills, CA	Research and development
	Chapel Hill, NC	Research and development
	Hillsboro, OR	Research and development
2	Bulgaria	
	Plovdiv	Research and development
	Sofia	Research and development
2	Toronto, Canada	Research and development
1	Espoo, Finland	Research and development
2	France	
	Aix-en-Provence	Research and development
	Marseille	Research and development
1	Bangalore, India	Administrative offices, research and development and service functions
2	The Netherlands	
	Rotterdam	Research and development
	Vught	Research and development
1	Seoul, South Korea	Sales
1	Taipei, Taiwan	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*

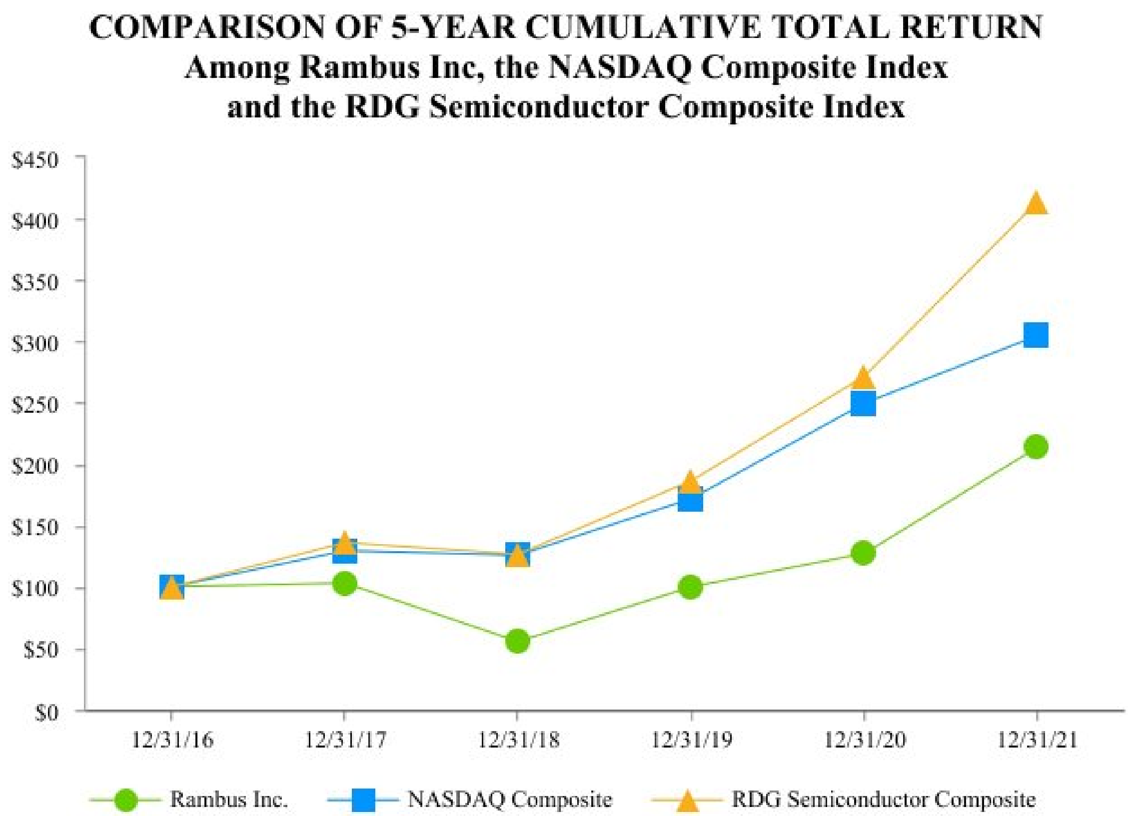
Not applicable.

PART II

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 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, 2016 to December 31, 2021.



Fiscal years ending:

	Base Period 12/31/16	12/31/17	12/31/18	12/31/19	12/31/20	12/31/21
Rambus Inc.	$100.00	$103.27	$55.70	$100.04	$126.80	$213.43
NASDAQ Composite	$100.00	$129.64	$125.96	$172.17	$249.51	$304.85
RDG Semiconductor Composite	$100.00	$135.72	$126.17	$186.57	$271.57	$413.36

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, 2022, there were 482 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.

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

Share Repurchase Program

On October 29, 2020, our Board approved a new share repurchase program authorizing the repurchase of up to an aggregate of 20.0 million shares (the “2020 Repurchase Program”). Share repurchases under the 2020 Repurchase Program 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 2020 Repurchase Program. As part of the broader share repurchase program authorized by our Board on October 29, 2020, we entered into an accelerated share repurchase program with Deutsche Bank AG, London Branch as counterparty, through its agent Deutsche Bank Securities Inc. (“Deutsche Bank”) on November 11, 2020 (the “2020 ASR Program”), which was completed in the second quarter of 2021. Also in the second quarter of 2021, we entered into another accelerated share repurchase program with Deutsche Bank on June 15, 2021 (the “2021 ASR Program”), which was completed in the fourth quarter of 2021. After giving effect to the 2020 and 2021 ASR programs, detailed in the table below, we had remaining authorization to repurchase approximately 12.9 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 Program	Maximum Number of Shares that May Yet be Purchased Under the Program
Cumulative shares repurchased as of December 31, 2020 (1)	2,616,089	$ 18.63	2,616,089	17,383,911
April 1, 2021 - May 31, 2021 (1)	68,435	$ 18.63	68,435	17,315,476
June 1, 2021 - June 30, 2021 (2)	3,946,719	$ 22.82	3,946,719	13,368,757
October 1, 2021 - December 31, 2021(2)	435,577	$ 22.82	435,577	12,933,180
Cumulative shares repurchased as of December 31, 2021	7,066,820		7,066,820	

(1) In November 2020, we entered into the 2020 ASR Program with Deutsche Bank 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 2.6 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 2021, the accelerated share repurchase program was completed and we received an additional 0.1 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 2.7 million, with an average price paid per share of $18.63. Refer to Note 15, "Stockholders' Equity," of Notes to Consolidated Financial Statements of this Form 10-K for further discussion.

(2) In June 2021, we entered into the 2021 ASR Program with Deutsche Bank to repurchase an aggregate of $100.0 million of our common stock. We made an upfront payment of $100.0 million pursuant to the accelerated share repurchase program and received an initial delivery of 3.9 million shares 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. In October 2021, the accelerated share repurchase program was completed and we received an additional 0.4 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 4.4 million, with an average price paid per share of $22.82. Refer to Note 15, "Stockholders' Equity," of Notes to Consolidated Financial Statements of this Form 10-K for further discussion.

Unregistered Sales of Equity Securities and Use of Proceeds

None.

Recent Sales of Unregistered Equity Securities

None.

Item 6. *Reserved*

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.

Business Overview

Rambus produces products and innovations that address the fundamental challenges of accelerating data. We make industry-leading chips and Silicon IP that enable critical performance improvements for data center and other growing markets. The ongoing shift to the cloud, along with the widespread advancement of AI across the data center, 5G, automotive and IoT, has led to exponential growth in data usage and tremendous demands on data infrastructure. Creating fast and safe connections, both in and across systems, remains one of the most mission-critical design challenges limiting performance in advanced hardware for these markets.

As an industry pioneer with over 30 years of advanced semiconductor experience in interconnect technologies, Rambus is ideally positioned to address the challenges of moving and protecting data. We are a leader in high-performance memory subsystems, providing chips, Silicon IP and innovations that maximize the performance and security in data-intensive systems. Whether in the cloud, at the edge or in your hand, real-time and immersive applications depend on data throughput and integrity. Rambus products and innovations deliver the increased bandwidth, capacity and security required to meet the world’s data needs and drive ever-greater end-user experiences.

Our strategic objectives are focusing our product portfolio and research around our core strength in semiconductors, optimizing our operational efficiency, and leveraging our strong cash generation to re-invest for growth. We continue to maximize synergies across our businesses and customer base, leveraging the significant overlap in our ecosystem of customers, partners and influencers. The Rambus product and technology roadmap, as well as our go-to-market strategy, is driven by the application-specific requirements of our focus markets.

Executive Summary

Highlights from our annual results for the year ended December 31, 2021 were as follows:

- Revenue of $328.3 million;
- Operating expenses of $233.6 million;
- GAAP diluted net income per share of $0.16; and
- Net cash provided by operating activities of $209.2 million.

We had record annual product revenue of $143.9 million in 2021, which was primarily driven by our memory interface chips and was up 26% as compared to 2020. In addition, our cash provided by operating activities for 2021 was $209.2 million, which was a record for the Company and up 13% as compared to 2020.

Operational Highlights

Revenue Sources

The Company’s consolidated revenue is comprised of product revenue, contract and other revenue and royalties.

Product revenue consists primarily of memory interface chips and is a significant and growing segment of the business. Our memory interface chips are sold to major DRAM manufacturers, Micron, Samsung and SK hynix, as well as directly to system manufacturers and cloud providers, for integration into server memory modules. Product revenue accounted for 44%, 46% and 32% of our consolidated revenue for the years ended December 31, 2021, 2020 and 2019, respectively.

Contract and other revenue consists primarily of Silicon IP, which is comprised of our high-speed interface and security IP. Revenue sources under contract and other include our 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 accounts receivable in any given period. Contract and other revenue accounted for 14%, 19% and 27% of our consolidated revenue for the years ended December 31, 2021, 2020 and 2019, respectively.

Royalty revenue is derived from our patent licenses, through which we provide our customers certain rights to our broad worldwide portfolio of patented inventions. Our patent licenses enable our customers to use a portion of our patent portfolio in their own digital electronics products. The licenses typically range in term up to ten years and define the specific field of use where our customers may utilize our inventions in their products. Royalties may be structured as fixed, variable or a hybrid of fixed and variable royalty payments. Leading semiconductor and electronic system companies such as AMD, Broadcom, Cisco, CXMT, IBM, Infineon, Kioxia, Marvell, Mediatek, Micron, Nanya, NVIDIA, Panasonic, Phison, Qualcomm, Samsung, SK hynix, Socionext, STMicroelectronics, Toshiba, Western Digital, Winbond, and Xilinx have licensed our patents. The vast majority of our patents originate from our internal research and development efforts. Revenues from royalties accounted for 42%, 34% and 41% of our consolidated revenue for the years ended December 31, 2021, 2020 and 2019, respectively.

Costs and Expenses

Cost of product revenue for 2021 increased approximately $11.7 million to $49.4 million from $37.7 million as compared to 2020, primarily due to increases in sales volumes of our memory interface chips.

Cost of contract and other revenue for 2021 decreased approximately $0.9 million to $4.7 million from $5.6 million as compared to 2020.

Research and development expenses continue to play a key role in our efforts to maintain product innovations. Our research and development expenses for 2021 decreased approximately $4.2 million as compared to 2020, primarily due to decreased engineering development tool costs of $3.6 million, headcount-related expenses of $1.7 million, retention bonus expense related to acquisitions of $1.1 million, allocated information technology costs of $0.8 million, facilities costs of $0.7 million and prototyping costs of $0.6 million, offset by an increase in engineering costs allocated to cost of revenue of $1.9 million, consulting costs of $1.8 million and stock-based compensation expense of $0.6 million.

Sales, general and administrative expenses for 2021 increased approximately $4.6 million as compared to 2020, primarily due to increased consulting, legal and accounting costs of $3.0 million related to the shareholder activism activity and restatement matters, acquisition-related costs (including retention bonus expense) of $1.8 million, allocated information technology costs of $0.8 million, stock-based compensation expense of $0.8 million and recruiting expenses of $0.6 million, offset by decreased facilities costs of $2.2 million, other consulting costs of $0.6 million and sales and marketing costs of $0.6 million.

Impact of the COVID-19 Pandemic

In December 2019, the COVID-19 virus was reported in China, in January 2020 the World Health Organization (“WHO”) declared it a Public Health Emergency of International Concern, and in March 2020 the WHO declared it a pandemic. The COVID-19 pandemic and new variants have created significant global economic uncertainty and may adversely impact the business of our customers, partners and vendors. The extent of the impact of the ongoing COVID-19 pandemic and subsequent variants on our operational and financial performance will depend on certain developments, including the duration and spread of the outbreak, impact on our customers and our sales cycles, and impact on our partners or employees, all of which are uncertain and cannot be predicted. The extent to which the ongoing COVID-19 pandemic and subsequent variants may impact our financial condition or results of operations remains uncertain. Actual results could differ from any estimates and any such differences could be material to our financial statements. Furthermore, the effect of COVID-19 and the new variants may not be fully reflected in our results of operations until future periods, if at all.

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 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.

We have a high degree of revenue concentration. Our top five customers represented approximately 56% of our revenue for 2021 as compared to 46% in 2020 and 45% in 2019. 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 36% in 2021 as compared to 44% in 2020 and 41% in 2019. We expect that revenue derived from international customers will continue to represent a significant portion of our total revenue in the future. Currently, our revenue from international customers is denominated in U.S. dollars. For additional information concerning international revenue, refer to Note 7, “Segments and Major Customers,” of Notes to Consolidated Financial Statements of this Form 10-K.

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. Several of our licensees have renewed or extended their license agreements with us during the year ended December 31, 2021, including Qualcomm, Kioxia and Western Digital.

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, including the 2021 acquisitions of AnalogX and PLDA, as well as the 2019 acquisitions of Northwest Logic and the Secure Silicon IP and Protocols business from Verimatrix, formerly Inside Secure. Similarly, we evaluate our current businesses and technologies that are not aligned with our core business for potential divestiture, such as the sale of our Payments and Ticketing businesses to Visa International Service Association in 2019. We expect to continue to evaluate and potentially enter into strategic acquisitions or divestitures which may adversely impact our business and operating results.

Results of Operations

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

	Years Ended December 31,		
	2021	2020	2019
Revenue:			
Product revenue	43.9 %	46.3 %	32.1 %
Royalties	41.6 %	34.3 %	41.4 %
Contract and other revenue	14.5 %	19.4 %	26.5 %
Total revenue	100.0 %	100.0 %	100 %
Cost of revenue:			
Cost of product revenue	15.0 %	15.3 %	11.9 %
Cost of contract and other revenue	1.5 %	2.3 %	4.4 %
Amortization of acquired intangible assets	4.9 %	7.1 %	6.3 %
Total cost of revenue	21.4 %	24.7 %	22.6 %
Gross profit	78.6 %	75.3 %	77.4 %
Operating expenses:			
Research and development	41.3 %	56.8 %	68.9 %
Sales, general and administrative	27.8 %	35.0 %	44.2 %
Amortization of acquired intangible assets	0.4 %	0.4 %	1.2 %
Restructuring and other charges	0.1 %	1.7 %	3.9 %
Loss on divestiture	— %	— %	3.3 %
Change in fair value of earn-out liability	1.6 %	(0.7)%	— %
Total operating expenses	71.2 %	93.2 %	121.4 %
Operating income (loss)	7.4 %	(17.9)%	(44.0)%
Interest income and other income (expense), net	3.0 %	7.3 %	12.0 %
Interest expense	(3.3)%	(4.2)%	(4.3)%
Interest and other income (expense), net	(0.3)%	3.1 %	7.7 %
Income (loss) before income taxes	7.1 %	(14.8)%	(36.3)%
Provision for income taxes	1.5 %	1.6 %	1.5 %
Net income (loss)	5.6 %	(16.4)%	(37.8)%

	Years Ended December 31,			2020 to 2021	2019 to 2020
(Dollars in millions)	2021	2020	2019	Change	Change
Total Revenue					
Product revenue	$ 143.9	$ 114.0	$ 73.0	26.3 %	56.2 %
Royalties	136.7	84.6	94.4	61.7 %	(10.4)%
Contract and other revenue	47.7	47.7	60.2	(0.2)%	(20.7)%
Total revenue	$ 328.3	$ 246.3	$ 227.6	33.3 %	8.2 %

Product Revenue

Product revenue consists of revenue from the sale of memory and security products.

Product revenue increased approximately $29.9 million to $143.9 million for the year ended December 31, 2021 from $114.0 million for 2020. The increase was due to continued market share gains of our memory interface chips.

Product revenue increased approximately $41.0 million to $114.0 million for the year ended December 31, 2020 from $73.0 million for 2019. The increase was due to market share gains of our memory interface chips.

We believe that product revenue will continue to increase in 2022 as compared to 2021, mainly from the sale of our memory interface chips. However, our ability to continue to grow product revenue is dependent on, among other things, our ability to continue to obtain orders from customers, our ability to meet our customers' demands and our ability to mitigate any supply chain risk due to the ongoing COVID-19 pandemic and subsequent variants.

Royalties

Royalty revenue, which includes patent and technology license royalties, increased approximately $52.1 million to $136.7 million for the year ended December 31, 2021 from $84.6 million for 2020. The increase was primarily due to the timing and structure of license renewals.

Royalty revenue decreased approximately $9.8 million to $84.6 million for the year ended December 31, 2020 from $94.4 million for 2019. The decrease was primarily due to the timing and structure of license renewals.

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.

Contract and Other Revenue

Contract and other revenue consists of revenue from technology development projects.

Contract and other revenue remained flat at $47.7 million for the year ended December 31, 2021 as compared to 2020.

Contract and other revenue decreased approximately $12.5 million to $47.7 million for the year ended December 31, 2020 from $60.2 million for 2019. The decrease was primarily due to the divestiture of our former Payments and Ticketing businesses resulting in no corresponding revenue in 2020, offset by growth experienced in our Silicon IP offerings.

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.

Cost of Product Revenue

	Years Ended December 31,			2020 to 2021	2019 to 2020
(Dollars in millions)	**2021**	**2020**	**2019**	**Change**	**Change**
Cost of product revenue	$ 49.4	$ 37.7	$ 27.2	30.9 %	39.0 %

Cost of product revenue are costs attributable to the sale of memory and security products.

For the year ended December 31, 2021 as compared to 2020, cost of product revenue increased 30.9% primarily due to increases in sales volumes of our memory interface chips.

For the year ended December 31, 2020 as compared to 2019, cost of product revenue increased 39.0% primarily due to increases in sales volumes of our memory interface chips.

In the near term, we expect costs of product revenue to continue to be higher as we expect higher sales of our various products in 2022 as compared to 2021.

Cost of Contract and Other Revenue

	Years Ended December 31,			2020 to 2021	2019 to 2020
(Dollars in millions)	**2021**	**2020**	**2019**	**Change**	**Change**
Cost of contract and other revenue	$ 4.7	$ 5.6	$ 9.9	(15.8)%	(43.0)%

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.

For the year ended December 31, 2021 as compared to 2020, cost of contract and other revenue decreased 15.8% due to lower engineering services associated with the contracts.

For the year ended December 31, 2020 as compared to 2019, cost of contract and other revenue decreased 43.0% primarily due to the divestiture of our Payments and Ticketing businesses in the fourth quarter of 2019.

In the near term, we expect costs of contract and other revenue to vary from period to period based on varying revenue recognized from contract and other revenue.

Research and Development Expenses

(Dollars in millions)	Years Ended December 31, 2021	2020	2019	2020 to 2021 Change	2019 to 2020 Change
Research and development expenses					
Research and development expenses	$ 125.1	$ 129.8	$ 145.8	(3.6)%	(11.0)%
Stock-based compensation	10.6	10.0	11.0	5.7 %	(9.1)%
Total research and development expenses	$ 135.7	$ 139.8	$ 156.8	(3.0)%	(10.8)%

Research and development expenses are those expenses incurred for the development of applicable technologies.

For the year ended December 31, 2021 as compared to 2020, total research and development expenses decreased 3.0% primarily due to decreased engineering development tool costs of $3.6 million, headcount-related expenses of $1.7 million, retention bonus expense related to acquisitions of $1.1 million, allocated information technology costs of $0.8 million, facilities costs of $0.7 million and prototyping costs of $0.6 million, offset by an increase in engineering costs allocated to cost of revenue of $1.9 million, consulting costs of $1.8 million and stock-based compensation expense of $0.6 million.

For the year ended December 31, 2020 as compared to 2019, total research and development expenses decreased 10.8% primarily due to decreased headcount-related expenses of $11.8 million (which includes the reduction in headcount due to the divestiture of the Payments and Ticketing businesses in 2019), consulting costs of $5.2 million, travel costs of $1.9 million and stock-based compensation expense of $1.0 million, offset by increased retention bonus expense related to acquisitions of $2.0 million and prototyping costs of $0.9 million.

In the near term, we expect research and development expenses 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 Expenses

(Dollars in millions)	Years Ended December 31, 2021	2020	2019	2020 to 2021 Change	2019 to 2020 Change
Sales, general and administrative expenses					
Sales, general and administrative expenses	$ 74.5	$ 70.7	$ 85.2	5.4 %	(16.9)%
Stock-based compensation	16.5	15.7	15.4	4.9 %	2.0 %
Total sales, general and administrative expenses	$ 91.0	$ 86.4	$ 100.6	5.3 %	(14.0)%

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. 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, 2021 as compared to 2020, total sales, general and administrative costs increased 5.3% primarily due to increased consulting, legal and accounting costs of $3.0 million related to the shareholder activism activity and restatement matters during the first quarter of 2021, acquisition-related costs (including retention bonus expense) of $1.8 million, allocated information technology costs of $0.8 million, stock-based compensation expense of $0.8 million and recruiting expenses of $0.6 million, offset by decreased facilities costs of $2.2 million, other consulting costs of $0.6 million and sales and marketing costs of $0.6 million.

For the year ended December 31, 2020 as compared to 2019, total sales, general and administrative costs decreased 14.0% primarily due to decreased headcount-related expenses of $5.4 million, acquisition and divestiture-related costs of $4.1 million, travel costs of $3.4 million and consulting costs of $2.7 million, offset by increased bonus accrual expense of $0.5 million and stock-based compensation expense of $0.3 million.

In the future, sales, general and administrative expenses 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 expenses to remain relatively flat.

Amortization of Acquired Intangible Assets

(Dollars in millions)	Years Ended December 31, 2021	2020	2019	2020 to 2021 Change	2019 to 2020 Change
Amortization of acquired intangible assets					
Amortization of acquired intangible assets included in total cost of revenue	$ 16.2	$ 17.4	$ 14.3	(6.4)%	21.2 %
Amortization of acquired intangible assets included in total operating expenses	1.2	1.0	2.7	15.6 %	(61.3)%
Total amortization of acquired intangible assets	$ 17.4	$ 18.4	$ 17.0	(5.1)%	7.9 %

Amortization expense is related to various acquired IP.

For the year ended December 31, 2021 as compared to 2020, total amortization of acquired intangible assets decreased 5.1% primarily due to certain intangible assets being fully amortized, offset by additional amortization from intangible assets acquired as part of the acquisitions of AnalogX and PLDA in 2021.

For the year ended December 31, 2020 as compared to 2019, total amortization of acquired intangible assets increased 7.9% primarily due to additional amortization from intangible assets acquired as part of the acquisitions from the second half of 2019, partially offset by certain other intangible assets being fully amortized.

Restructuring and Other Charges

(Dollars in millions)	Years Ended December 31, 2021	2020	2019	2020 to 2021 Change	2019 to 2020 Change
Restructuring and other charges	$ 0.4	$ 4.1	$ 8.8	NM*	(53.6)%

* NM — percentage is not meaningful

In November 2020, we initiated a restructuring plan to reduce overall expenses to improve future profitability by reducing spending on research and development efforts and sales, general and administrative programs (the “2020 Restructuring Plan”). As a result, we recorded a charge of $3.3 million primarily related to headcount costs.

During 2019, we initiated a restructuring program to reduce overall expenses. Additionally, we recorded other severance-related charges of $1.4 million.

Refer to Note 18, “Restructuring and Other Charges,” of Notes to Consolidated Financial Statements of this Form 10-K for further discussion.

Change in Fair Value of Earn-Out Liability

(Dollars in millions)	Years Ended December 31, 2021	2020	2019	2020 to 2021 Change	2019 to 2020 Change
Change in fair value of earn-out liability	$ 5.3	$ (1.8)	$ —	NM*	100.0 %

* NM — percentage is not meaningful

During the fourth quarter of 2021, we remeasured the fair value of the earn-out liability related to the acquisition of PLDA, which is subject to certain revenue targets of the acquired business for the next three years. The remeasurement of the earn-out liability resulted in an additional expense of $5.3 million on our consolidated statements of operations.

During 2020, we recorded a full reduction in the fair value of the earn-out liability related to the 2019 asset purchase agreement to acquire the Secure Silicon IP and Protocols business from Verimatrix, formerly Inside Secure, since the specified performance milestones were not met for calendar year 2020, which resulted in a gain on our consolidated statements of operations.

Interest and Other Income (Expense), Net

	Years Ended December 31,			2020 to 2021	2019 to 2020
(Dollars in millions)	**2021**	**2020**	**2019**	**Change**	**Change**
Interest income and other income (expense), net	$ 9.7	$ 17.8	$ 27.5	(45.6) %	(34.9)%
Interest expense	(10.7)	(10.3)	(9.9)	3.5 %	5.0 %
Interest and other income (expense), net	$ (1.0)	$ 7.5	$ 17.6	(113.2)%	(57.3)%

Interest income and other income (expense), net, consists primarily of interest income of $9.3 million, $14.6 million and $20.5 million for the years ended December 31, 2021, 2020 and 2019, respectively, due to the significant financing component of licensing agreements. Interest income and other income (expense), net, also includes 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.

Interest expense for all periods disclosed consists primarily of interest expense associated with the 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”), as well as the coupon interest related to these notes. Refer to Note 12, “Convertible Notes,” of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

Provision for Income Taxes

	Years Ended December 31,			2020 to 2021	2019 to 2020
(Dollars in millions)	**2021**	**2020**	**2019**	**Change**	**Change**
Provision for income taxes	$ 5.0	$ 3.9	$ 3.4	25.9 %	15.1 %
Effective tax rate	21.3 %	(10.8)%	(4.1)%		

Our effective tax rate for the year ended December 31, 2021 differed from the U.S. statutory rate primarily due to the foreign-derived intangible income deduction and certain capitalized research expenditures, partially offset by the change in the valuation allowance against U.S. deferred tax assets. Our effective tax rate for the year ended December 31, 2020 differed from the U.S. statutory rate primarily due to the expiration of foreign tax credits, partially offset by the change in the valuation allowance against U.S. deferred tax assets. Our effective tax rate for the year ended December 31, 2019 was different from the U.S. statutory rate primarily due to the full valuation allowance on the current year tax loss.

We recorded a provision for incomes taxes of $5.0 million for the year ended December 31, 2021, which was primarily comprised of taxes on foreign earnings, the full valuation allowance on U.S. federal deferred tax assets, withholding tax expense, tax expense from the amortization of indefinite-lived intangibles and an increase in the valuation allowance on California deferred tax assets. For the year ended December 31, 2021, we paid withholding taxes of $20.4 million. We recorded a provision for incomes taxes of $3.9 million for the year ended December 31, 2020, which was primarily comprised of taxes on foreign earnings, the full valuation allowance on U.S. federal deferred tax assets, withholding tax expense, tax expense from the amortization of indefinite-lived intangibles, partially offset by a partial California deferred tax asset valuation allowance release. For the year ended December 31, 2020, we paid withholding taxes of $19.7 million. We recorded a provision for incomes taxes of $3.4 million for the year ended December 31, 2019, which was primarily comprised of taxes on foreign earnings, the full valuation allowance on U.S. federal deferred tax assets, withholding tax expense, and acquisition-related impacts. For the year ended December 31, 2019, we paid withholding taxes of $17.1 million.

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. During 2020, as a result of the enactment of California A.B. 85 and the temporary suspension of California net operating loss utilization for tax years 2020 through 2022, we released $0.7 million of the valuation allowance on our deferred tax asset for California research and development tax credits. In 2021, based on available evidence, we recorded a full valuation allowance on our California deferred tax assets. We continue to maintain a full valuation allowance on our California and U.S. federal deferred tax assets as we do not expect to be able to fully utilize them.

Liquidity and Capital Resources

(In millions)	December 31, 2021	December 31, 2020
Cash and cash equivalents	$ 107.9	$ 129.0
Marketable securities	377.7	373.6
Total cash, cash equivalents, and marketable securities	$ 485.6	$ 502.6

	Years Ended December 31,		
(In millions)	2021	2020	2019
Net cash provided by operating activities	$ 209.2	$ 185.5	$ 128.5
Net cash used in investing activities	$ (115.7)	$ (97.6)	$ (141.5)
Net cash used in financing activities	$ (114.2)	$ (61.2)	$ (0.3)

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, 2021 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. Further, 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 to our stockholders, on October 29, 2020, our Board approved the 2020 Repurchase Program authorizing the repurchase of up to an aggregate of 20.0 million shares. Share repurchases under the 2020 Repurchase Program 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 2020 Repurchase Program. The 2020 Repurchase Program replaced the previous program approved by our Board in January 2015 and canceled the remaining shares outstanding as part of the previous authorization.

On November 11, 2020, we entered into the 2020 ASR Program with Deutsche Bank. The 2020 ASR Program was part of the share repurchase program previously authorized by our Board on October 29, 2020. Under the 2020 ASR Program, we pre-paid to Deutsche Bank the $50.0 million purchase price for our common stock and, in turn, we received an initial delivery of approximately 2.6 million shares of our common stock from Deutsche Bank in the fourth quarter of 2020, 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 2021, the accelerated share repurchase program was completed and we received an additional 0.1 million shares of our common stock, which were retired, as the final settlement of the accelerated share repurchase program.

On June 15, 2021, we entered into the 2021 ASR Program with Deutsche Bank. The 2021 ASR Program was part of the share repurchase program previously authorized by our Board on October 29, 2020. Under the 2021 ASR Program, we pre-paid to Deutsche Bank the $100.0 million purchase price for our common stock and, in turn, we received an initial delivery of approximately 3.9 million shares of our common stock from Deutsche Bank in the second quarter of 2021, 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. During the fourth quarter of 2021, the accelerated share repurchase program was completed and we received an additional 0.4 million shares of our common stock, which were retired, as the final settlement of the accelerated share repurchase program.

As of December 31, 2021, there remained an outstanding authorization to repurchase approximately 12.9 million shares of our outstanding common stock under the 2020 Repurchase Plan. Refer to “Share Repurchase Program” below.

Operating Activities

Cash provided by operating activities of $209.2 million for the year ended December 31, 2021 was primarily attributable to the cash generated from customer licensing, product sales and engineering services fees. Changes in operating assets and liabilities for the year ended December 31, 2021 primarily included decreases in unbilled receivables, inventories, prepaids and other current assets and increases in accounts payable and deferred revenue, offset by increases in accounts receivable, as well as decreases in income taxes payable, accrued salaries and benefits and operating lease liabilities.

Cash provided by operating activities of $185.5 million for the year ended December 31, 2020 was primarily attributable to the cash generated from customer licensing, product sales and engineering services fees. Changes in operating assets and liabilities for the year ended December 31, 2020 primarily included decreases in unbilled receivables, accounts receivable, prepaids and other current assets, and an increase in accrued salaries and benefits, offset by a decrease in income taxes payable and an increase in inventories.

Cash provided by operating activities of $128.5 million for the year ended December 31, 2019 was primarily attributable to the cash generated from customer licensing, technology and software licenses 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, 2019 primarily included decreases in accounts receivable, unbilled receivables and deferred revenue, offset by increases in prepaids and other current assets, inventories and accrued salaries and benefits.

Investing Activities

Cash used in investing activities of $115.7 million for the year ended December 31, 2021 consisted of purchases of available-for-sale marketable securities of $567.9 million, $97.1 million paid for the acquisitions of AnalogX and PLDA, net of total cash acquired of $8.6 million, and $13.8 million paid to acquire property, plant and equipment, offset by proceeds from the maturities and sale of available-for-sale marketable securities of $336.2 million and $227.0 million, respectively.

Cash used in investing activities of $90.4 million for the year ended December 31, 2020 consisted of purchases of available-for-sale marketable securities of $899.0 million, $29.7 million paid to acquire property, plant and equipment, and $1.1 million paid to settle a net working capital adjustment related to the divestiture of our Payments and Ticketing businesses, offset by proceeds from the maturities and sale of available-for-sale marketable securities of $817.8 million and $21.6 million, respectively.

Cash used in investing activities of $141.5 million for the year ended December 31, 2019 primarily consisted of purchases of available-for-sale marketable securities of $657.4 million, $21.9 million paid for the acquisition of Northwest Logic, net of cash acquired of $0.1 million, $45.0 million paid for the acquisition of the Secure Silicon IP and Protocols business from Verimatrix, formerly Inside Secure, and $6.5 million paid to acquire property, plant and equipment, offset by proceeds from the maturities and sale of available-for-sale marketable securities of $507.4 million and $6.8 million, respectively, and net proceeds of $76.0 million from the divestiture of our Payments and Ticketing businesses.

Financing Activities

Cash used in financing activities of $114.2 million for the year ended December 31, 2021 was primarily due to an aggregate payment of $100.0 million to Deutsche Bank as part of the 2021 ASR Program. We also paid $10.6 million in payments of taxes on restricted stock units, $12.5 million under installment payment arrangements to acquire fixed assets and $0.1 million in fees related to the 2021 ASR Program, offset by $9.0 million in proceeds from the issuance of common stock under equity incentive plans.

Cash used in financing activities of $61.2 million for the year ended December 31, 2020 was primarily due to an aggregate payment of $50.0 million to Deutsche Bank as part of the 2020 ASR Program. We also paid $13.2 million under installment payment arrangements to acquire fixed assets, $9.4 million in payments of taxes on restricted stock units and $0.1 million in fees related to the 2020 ASR Program, offset by $11.5 million in proceeds from the issuance of common stock under equity incentive plans.

Cash used in financing activities was $0.3 million for the year ended December 31, 2019 and was primarily due to $8.4 million in payments under installment payment arrangements to acquire fixed assets and $7.0 million in payments of taxes on restricted stock units, offset by $15.1 million proceeds from the issuance of common stock under equity incentive plans.

Contractual Obligations

As of December 31, 2021, our material contractual obligations were as follows:

(In thousands)	Total	2022	2023	2024	2025	2026
Contractual obligations [(1) (2) (3)]						
Software licenses [(4)]	$ 16,348	$ 11,597	$ 3,274	$ 1,477	$ —	$ —
Acquisition retention bonuses [(5)]	9,528	5,194	2,167	2,167	—	—
Convertible notes [(6)]	172,500	—	172,500	—	—	—
Interest payments related to convertible notes	3,564	2,372	1,192	—	—	—
Total	$ 201,940	$ 19,163	$ 179,133	$ 3,644	$ —	$ —

(1) The above table does not reflect possible payments in connection with unrecognized tax benefits of approximately $20.2 million including $18.9 million recorded as a reduction of long-term deferred tax assets and $1.3 million in long-term income taxes payable, as of December 31, 2021. As noted in Note 19, “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.

(2) For our lease commitments as of December 31, 2021, refer to Note 10, Leases,” of Notes to Consolidated Financial Statements of this Form 10-K.

(3) Our other contractual obligations as of December 31, 2021 were not material.

(4) We have commitments with various software vendors for agreements generally having terms longer than one year.

(5) In connection with the acquisitions of Northwest Logic in the third quarter of 2019 and the Secure Silicon IP and Protocols business in the fourth quarter of 2019, and the acquisitions of AnalogX and PLDA in the third quarter of 2021, we are obligated to pay retention bonuses to certain employees subject to certain eligibility and acceleration provisions including the condition of employment.

(6) 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. Refer to Note 12, “Convertible Notes,” of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

Share Repurchase Program

On October 29, 2020, our Board approved the 2020 Repurchase Program authorizing the repurchase of up to an aggregate of 20.0 million shares. Share repurchases under the 2020 Repurchase Program 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 2020 Repurchase Program. The 2020 Repurchase Program replaced the previous program approved by the Board in January 2015 and canceled the remaining shares outstanding as part of the previous authorization.

On November 11, 2020, we entered into the 2020 ASR Program with Deutsche Bank. The 2020 ASR Program was part of the 2020 Repurchase Program previously authorized by our Board on October 29, 2020. Under the 2020 ASR Program, we pre-paid to Deutsche Bank the $50.0 million purchase price for our common stock and, in turn, we received an initial delivery of approximately 2.6 million shares of our common stock from Deutsche Bank in the fourth quarter of 2020, 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 2021, the accelerated share repurchase program was completed and we received an additional 0.1 million shares of our common stock, which were retired, as the final settlement of the accelerated share repurchase program.

On June 15, 2021, we entered into the 2021 ASR Program with Deutsche Bank. The 2021 ASR Program was part of the share repurchase program previously authorized by our Board on October 29, 2020. Under the 2021 ASR Program, we pre-paid to Deutsche Bank the $100.0 million purchase price for our common stock and, in turn, we received an initial delivery of approximately 3.9 million shares of our common stock from Deutsche Bank in the second quarter of 2021, 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. During the fourth quarter of 2021, the accelerated share repurchase program was completed and we received an additional 0.4 million shares of our common stock, which were retired, as the final settlement of the accelerated share repurchase program.

As of December 31, 2021, there remained an outstanding authorization to repurchase approximately 12.9 million shares of our outstanding common stock under the 2020 Repurchase Plan.

We record share 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. During the year ended December 31, 2021, the cumulative price of $95.8 million was recorded as an increase to accumulated deficit.

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. Refer to Note 12, "Convertible Notes," of Notes to Consolidated Financial Statements of this Form 10-K for additional details.

Internal Control Over Financial Reporting

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we 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. Our disclosure controls and procedures are designed to ensure that information required to be disclosed in the reports we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in the Securities and Exchange Commission's rules and forms, and that such information is accumulated and communicated to our management, including the Chief Executive Officer and the Chief Financial Officer, to allow timely decisions regarding required disclosures. Any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objective and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on this evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of December 31, 2021, the design and operation of our disclosure controls and procedures were effective at a reasonable assurance level.

As previously disclosed in our Annual Report on Form 10-K/A for the year ended December 31, 2020, our management concluded that we did not maintain effective internal control over financial reporting as of December 31, 2020, due to the inadequate design and maintenance of controls to evaluate and monitor the accounting for patent and technology licensing arrangements with unusual contract terms. We have taken necessary remediation steps to address the material weakness discussed above to strengthen our internal control over financial reporting. These include enhancement of our existing contract review control for patent and technology licensing arrangements, as well as implementation of a new control designed to evaluate and monitor, at inception and on a quarterly basis, the accounting assessment of patent and technology licensing arrangements with unusual terms.

Consequently, our management has concluded that the identified material weakness in internal control over financial reporting has been considered remediated as of December 31, 2021, as the related internal controls have been in operation for a sufficient period of time and our management has concluded, through testing, that these controls are operating effectively.

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. Substantially 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 price basis. We have established standalone selling prices for all of our offerings - specifically, the 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 product, royalty and contract and other revenue. Products primarily consist of memory interface chips sold directly and indirectly to module manufacturers and OEMs worldwide through multiple channels, including our direct sales force and distributors. Royalty revenue consists of patent and technology license royalties. Contract and other revenue consists of software license fees, engineering fees associated with integration of our technology solutions into our customers' products and support and maintenance fees.

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.

Royalty Revenue

Our patent and technology licensing arrangements generally range between one year and ten 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), 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 5%, 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 only recognize revenue on contracts in which the parties have present enforceable rights and obligations and 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 recorded when we receive the actual royalty report from the licensee.

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' 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 license and customization services revenue based on an over time model, measured using the input method. License and customization services revenue is reported as part of contract and other revenue. Due to the nature of the work performed in these arrangements, the estimation of the over time model is complex and involves significant judgment. The key factor reviewed by us to estimate costs to complete each contract is the estimated man-months necessary to complete the project. We recognize license renewal revenue at the beginning of the renewal period.

Significant Judgments

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

- We have adequate tools and controls in place, and substantial experience and expertise in timely and accurately tracking man-months incurred in completing customization and other professional services, and quantifying changes in estimates.

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

- For fixed-fee arrangements in which cash is being received over a period exceeding a year, 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 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 sales and usage.

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. 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.

When goodwill is assessed for impairment, we have the option to perform an assessment of qualitative factors of impairment (optional assessment) prior to necessitating a quantitative impairment test. Should the optional assessment be used for any given year, qualitative factors to consider for a reporting unit include: cost factors; financial performance; legal, regulatory, contractual, political, business, or other factors; entity specific factors; industry and market considerations; macroeconomic conditions; and other relevant events and factors affecting the reporting unit. If we determine in the qualitative assessment that it is more likely than not that the fair value of the reporting unit is less than its carrying value, a quantitative test is then performed. Otherwise, no further testing is required. For a reporting unit tested using a quantitative approach, we compare the fair value of the reporting unit with the carrying amount of the reporting unit, including goodwill. The fair value of the reporting unit is estimated using an income approach.

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 its current business model. Our discounted cash flow projections are based on its 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.

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 six months to ten 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 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 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, 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 (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, 2021, our consolidated balance sheet included net deferred tax assets, before valuation allowance, of approximately $186.9 million, which consists of net operating loss carryovers, tax credit carryovers, capitalized research, amortization, employee stock-based compensation expenses, certain liabilities and certain assets. As of December 31, 2021, we have a valuation allowance of $206.9 million, resulting in net deferred tax liabilities of $19.9 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 or other refundable taxes 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 maintain 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. 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. Refer to Note 14. 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.

Business Combinations

We account for acquisitions of businesses using the purchase method of accounting, which requires us to recognize separately from goodwill the assets acquired and the liabilities assumed at their acquisition date fair values. While we use our 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, we 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 on our consolidated statements of operations.

Accounting for business combinations requires us to make significant estimates and assumptions, especially at the acquisition date including our estimates for intangible assets, contractual obligations assumed and pre-acquisition contingencies where applicable. Although we believe 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. Significant estimates and assumptions made by us in estimating the fair value of the existing technologies included revenue growth rates, operating expense margins, technology obsolescence rates and discount rates. Unanticipated events and circumstances may occur that may affect the accuracy or validity of such assumptions, estimates or actual results.

Recent Accounting Pronouncements

Refer to Note 3, Recent Accounting Pronouncements," of Notes to Consolidated Financial Statements of this Form 10-K for discussion 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 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, 2021, we had an investment portfolio of fixed income marketable securities of $398.1 million, including cash equivalents. If market interest rates were to increase immediately and uniformly by 1.0% from the levels as of December 31, 2021, the fair value of the portfolio would decline by approximately $3.4 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 France, the Netherlands and the United Kingdom, design centers in Canada, India, Bulgaria and Finland and small business development offices in Australia, China, Japan, South Korea and Taiwan. We monitor our foreign currency exposure; however, as of December 31, 2021, we believe our foreign currency exposure is not material enough to warrant foreign currency hedging.

Item 8. *Financial Statements and Supplementary Data*

Refer to 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, 2021, our disclosure controls and procedures were effective.

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 a 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;

ii. provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that 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, 2021. 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 this assessment, our management has concluded that, as of December 31, 2021, our internal control over financial reporting was effective.

The effectiveness of our internal control over financial reporting as of December 31, 2021 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears herein.

Remediation of Previously Reported Material Weakness

As previously disclosed in our Annual Report on Form 10-K/A for the year ended December 31, 2020, our management concluded that we did not maintain effective internal control over financial reporting as of December 31, 2020, due to the inadequate design and maintenance of controls to evaluate and monitor the accounting for patent and technology licensing arrangements with unusual contract terms.

We have taken remediation steps to address the material weakness previously disclosed in our Annual Report on Form 10-K/A for the year ended December 31, 2020 to strengthen our internal control over financial reporting. These include enhancement of our existing contract review control for patent and technology licensing arrangements, as well as implementation of a new control designed to evaluate and monitor, at inception and on a quarterly basis, the accounting assessment of patent and technology licensing arrangements with unusual terms.

Consequently, our management has concluded that the identified material weakness in internal control over financial reporting has been considered remediated as of December 31, 2021, as the related internal controls have been in operation for a sufficient period of time and our management has concluded, through testing, that these controls are operating effectively.

Changes in Internal Control Over Financial Reporting

There have not been any changes in our internal control over financial reporting identified in management's evaluation pursuant to Rules 13a-15(d) or 15d-15(d) of the Exchange Act during the quarter ended December 31, 2021, that materially affected, or that we believe are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. *Other Information*

None.

Item 9C. *Disclosure Regarding Foreign Jurisdictions that Prevent Inspections*

Not applicable.

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 2022 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 https://investor.rambus.com/corporate-governance/committee-composition/code-of-business-conduct-and-ethics/default.aspx. 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 2022 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 2022 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 2022 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 2022 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.

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:

(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.

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, 2021 and 2020, and the related consolidated statements of operations, of comprehensive income (loss), of stockholders' equity and of cash flows for each of the three years in the period ended December 31, 2021, 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, 2021, 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, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021 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, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019.

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 appearing 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 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.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Acquisition of AnalogX Inc. and PLDA Group – Valuation of Existing Technology and In-process Research and Development (IPR&D) Intangible Assets

As described in Notes 2 and 21 to the consolidated financial statements, on July 2, 2021, the Company completed the acquisition of AnalogX Inc. for total consideration of approximately $47.5 million, which resulted in recording $6.3 million of existing technology and $3.8 million of in-process research and development (IPR&D) intangible assets. The fair value of the existing technology and IPR&D acquired from the AnalogX Inc. acquisition were estimated using the estimated current replacement cost method under the cost approach. Management applied significant judgment in estimating the fair value of the existing technology and IPR&D intangible assets from the AnalogX Inc. acquisition, which involved the use of significant assumptions related to cost of labor to recreate the intangible assets. On August 18, 2021, the Company completed the acquisition of PLDA Group for total consideration of approximately $85.6 million, which resulted in recording $20.4 million of existing technology and $7.4 million of IPR&D. The fair value of the existing technology and IPR&D intangible assets acquired from the PLDA acquisition were estimated using the multiple-period excess earnings method under the income approach. Management applied significant judgment in estimating the fair value of the existing technology and IPR&D intangible assets from the PLDA Group acquisition, which involved the use of significant assumptions related to revenue growth rates and discount rates.

The principal considerations for our determination that performing procedures relating to the valuation of existing technology and IPR&D intangible assets acquired from the AnalogX Inc. and PLDA Group acquisitions is a critical audit matter are (i) the significant judgment by management in determining the fair value of the existing technology and IPR&D intangible assets, (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating management's significant assumptions related to cost of labor to recreate existing technology and IPR&D intangible assets from the AnalogX Inc. acquisition, and revenue growth rates and discount rates related to the existing technology and IPR&D intangible assets from the PLDA Group acquisition, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the acquisition accounting, including controls over management's valuation of the existing technology and IPR&D intangible assets and controls over the development of significant assumptions related to cost of labor to recreate existing technology and IPR&D intangible assets from the AnalogX Inc. acquisition, and revenue growth rates and discount rates related to the existing technology and IPR&D intangible assets from the PLDA Group acquisition. These procedures also included, among others (i) reading the purchase agreements, (ii) testing management's process for determining the fair value of the existing technology and IPR&D intangible assets from both acquisitions, (iii) evaluating the appropriateness of the estimated current replacement cost valuation methods and multi-period excess earnings valuation methods, (iv) testing the completeness and accuracy of the underlying data used in the valuation methods, and (v) evaluating the reasonableness of the significant assumptions used by management related to cost of labor to recreate the existing technology and IPR&D intangible assets from the AnalogX Inc. acquisition, and revenue growth rates and discount rates related to the existing technology and IPR&D intangible assets from the PLDA Group acquisition. Evaluating management's assumptions related to the cost to recreate the intangible assets involved considering the current and historical compensation paid to engineers to recreate the technology. Evaluating the reasonableness of the revenue growth rates involved considering (i) the current and past performance of PLDA Group, (ii) the consistency with external market and industry data, and (iii) whether these significant assumptions were consistent with evidence obtained in other areas of the audit. Professionals with specialized skill and knowledge were used to assist in evaluating the (i) the appropriateness of the estimated current replacement cost valuation methods and multi-period excess earnings valuation methods and (ii) the reasonableness of the discount rate significant assumptions.

Revenue Recognition – License and Customization Services Revenue

As described in Note 2 to the consolidated financial statements, the Company recognizes license and customization services revenue based on an over time model, measured using the input method. License and customization services revenue is reported as part of contract and other revenue, which was $7.5 million for the year ended December 31, 2021. Due to the nature of the work performed in these arrangements, the estimation of the over time model is complex and involves significant judgment. The key factor reviewed by management to estimate costs to complete each contract is the estimated man-months necessary to complete the project.

The principal considerations for our determination that performing procedures relating to revenue recognition for license and customization services revenue is a critical audit matter are (i) the significant judgment by management in determining the estimated man-months necessary for contract completion for each contract, and (ii) a high degree of auditor judgment, subjectivity and effort in performing procedures and evaluating audit evidence related to management's estimate of man-months necessary to complete each project.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the Company's license and customization services revenue recognition process, including controls over management's determination of the estimate of man-months necessary to complete each contract. These procedures also included, among others, for a sample of contracts, testing management's process for determining the estimate of man-months. Evaluating the reasonableness of management's assumption related to the estimate of man-months involved (i) performing a comparison of the estimated man-months to completed projects of similar size and (ii) evaluating the timely identification of circumstances which may warrant a modification to a previous cost estimate, including an assessment of total man-months.

/s/ PricewaterhouseCoopers LLP
San Jose, California
February 28, 2022

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

RAMBUS INC.

CONSOLIDATED BALANCE SHEETS

	December 31, 2021	December 31, 2020
	(In thousands, except shares and per share amounts)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 107,891	$ 128,967
Marketable securities	377,718	373,682
Accounts receivable	44,065	27,903
Unbilled receivables	135,608	138,813
Inventories	8,482	14,466
Prepaids and other current assets	10,600	15,881
Total current assets	684,364	699,712
Intangible assets, net	58,420	36,487
Goodwill	278,810	183,222
Property, plant and equipment, net	56,035	57,693
Operating lease right-of-use assets	23,712	28,708
Deferred tax assets	4,047	4,353
Unbilled receivables	123,018	236,699
Other assets	4,240	4,535
Total assets	$ 1,232,646	$ 1,251,409
LIABILITIES & STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 11,279	$ 8,993
Accrued salaries and benefits	20,945	23,326
Convertible notes	163,687	—
Deferred revenue	24,755	10,198
Income taxes payable	20,607	20,064
Operating lease liabilities	5,992	4,724
Other current liabilities	20,002	18,559
Total current liabilities	267,267	85,864
Convertible notes	—	156,031
Long-term operating lease liabilities	29,099	34,305
Long-term income taxes payable	21,424	41,333
Deferred tax liabilities	23,985	14,276
Other long-term liabilities	28,475	6,894
Total liabilities	370,250	338,703
Commitments and contingencies (Notes 10, 13 and 20)		
Stockholders' equity:		
Convertible preferred stock, $.001 par value:		
Authorized: 5,000,000 shares; Issued and outstanding: no shares at December 31, 2021 and December 31, 2020	—	—
Common stock, $.001 par value:		
Authorized: 500,000,000 shares; Issued and outstanding: 109,292,235 shares at December 31, 2021 and 111,697,994 shares at December 31, 2020	109	112
Additional paid in capital	1,298,966	1,270,426
Accumulated deficit	(435,227)	(357,751)
Accumulated other comprehensive loss	(1,452)	(81)
Total stockholders' equity	862,396	912,706
Total liabilities and stockholders' equity	$ 1,232,646	$ 1,251,409

Refer to Notes to Consolidated Financial Statements

RAMBUS INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended December 31,		
	2021	2020	2019
	(In thousands, except per share amounts)		
Revenue:			
Product revenue	$ 143,935	$ 113,996	$ 72,972
Royalties	136,706	84,560	94,361
Contract and other revenue	47,663	47,766	60,270
Total revenue	328,304	246,322	227,603
Cost of revenue:			
Cost of product revenue	49,397	37,749	27,156
Cost of contract and other revenue	4,756	5,647	9,905
Amortization of acquired intangible assets	16,241	17,352	14,314
Total cost of revenue	70,394	60,748	51,375
Gross profit	257,910	185,574	176,228
Operating expenses:			
Research and development	135,678	139,837	156,815
Sales, general and administrative	91,057	86,441	100,551
Amortization of acquired intangible assets	1,226	1,061	2,743
Restructuring and other charges	368	4,089	8,821
Loss on divestiture	—	—	7,439
Change in fair value of earn-out liability	5,300	(1,800)	—
Total operating expenses	233,629	229,628	276,369
Operating income (loss)	24,281	(44,054)	(100,141)
Interest income and other income (expense), net	9,711	17,855	27,445
Interest expense	(10,706)	(10,340)	(9,852)
Interest and other income (expense), net	(995)	7,515	17,593
Income (loss) before income taxes	23,286	(36,539)	(82,548)
Provision for income taxes	4,952	3,932	3,416
Net income (loss)	$ 18,334	$ (40,471)	$ (85,964)
Net income (loss) per share:			
Basic	$ 0.17	$ (0.36)	$ (0.77)
Diluted	$ 0.16	$ (0.36)	$ (0.77)
Weighted-average shares used in per share calculations:			
Basic	110,538	113,254	110,948
Diluted	114,865	113,254	110,948

Refer to Notes to Consolidated Financial Statements

RAMBUS INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

	Years Ended December 31,		
	2021	2020	2019
		(In thousands)	
Net income (loss)	$ 18,334	$ (40,471)	$ (85,964)
Other comprehensive income (loss):			
Foreign currency translation adjustment	(366)	24	10,145
Unrealized gain (loss) on marketable securities, net of tax	(1,005)	(13)	54
Total comprehensive income (loss)	$ 16,963	$ (40,460)	$ (75,765)

Refer to Notes to Consolidated Financial Statements

RAMBUS INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Gain (Loss)	Total
	Shares	Amount				
			(In thousands)			
Balances at December 31, 2018	109,018	$ 109	$ 1,226,588	$ (204,294)	$ (10,291)	$ 1,012,112
Net loss	—	—	—	(85,964)	—	(85,964)
Foreign currency translation adjustment	—	—	—	—	10,145	10,145
Unrealized gain on marketable securities, net of tax	—	—	—	—	54	54
Issuance of common stock upon exercise of options, equity stock and employee stock purchase plan	3,113	3	8,078	—	—	8,081
Stock-based compensation	—	—	26,476	—	—	26,476
Cumulative effect adjustment from the adoption of ASC 842	—	—	—	4,469	—	4,469
Balances at December 31, 2019	112,131	112	1,261,142	(285,789)	(92)	975,373
Net loss	—	—	—	(40,471)	—	(40,471)
Foreign currency translation adjustment	—	—	—	—	24	24
Unrealized loss on marketable securities, net of tax	—	—	—	—	(13)	(13)
Issuance of common stock upon exercise of options, equity stock and employee stock purchase plan	2,183	3	2,081	—	—	2,084
Repurchase and retirement of common stock under repurchase plan	(2,616)	(3)	(18,575)	(31,491)	—	(50,069)
Stock-based compensation	—	—	25,778	—	—	25,778
Balances at December 31, 2020	111,698	112	1,270,426	(357,751)	(81)	912,706
Net income	—	—	—	18,334	—	18,334
Foreign currency translation adjustment	—	—	—	—	(366)	(366)
Unrealized loss on marketable securities, net of tax	—	—	—	—	(1,005)	(1,005)
Issuance of common stock upon exercise of options, equity stock and employee stock purchase plan	1,745	1	(1,657)	—	—	(1,656)
Issuance of common stock due to PLDA Group ("PLDA") acquisition	300	—	6,978	—	—	6,978
Repurchase and retirement of common stock under repurchase plan	(4,451)	(4)	(4,267)	(95,810)	—	(100,081)
Stock-based compensation	—	—	27,486	—	—	27,486
Balances at December 31, 2021	109,292	$ 109	$ 1,298,966	$ (435,227)	$ (1,452)	$ 862,396

Refer to Notes to Consolidated Financial Statements

RAMBUS INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2021	2020	2019
	(In thousands)		
Cash flows from operating activities:			
Net income (loss)	$ 18,334	$ (40,471)	$ (85,964)
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Stock-based compensation	27,486	25,778	26,476
Depreciation	26,810	29,773	23,644
Amortization of intangible assets	17,467	18,413	17,058
Non-cash interest expense and amortization of convertible debt issuance costs	7,656	7,243	6,854
Deferred income taxes	1,522	624	(1,816)
Loss on divestiture	—	—	7,439
Loss on equity investment	1,071	747	696
(Gain) loss on disposal of property, plant and equipment	(82)	(77)	157
Change in fair value of earn-out liability	5,300	(1,800)	—
Change in operating assets and liabilities, net of effects of acquisitions and divestiture:			
Accounts receivable	(13,521)	16,136	4,994
Unbilled receivables	118,452	156,202	147,868
Prepaid expenses and other assets	6,663	2,057	4,076
Inventories	6,109	(4,380)	(3,353)
Accounts payable	2,195	(2,176)	2,934
Accrued salaries and benefits and other liabilities	(1,642)	3,353	6,176
Income taxes payable	(25,309)	(17,852)	(15,925)
Deferred revenue	15,496	(1,486)	(3,497)
Operating lease liabilities	(4,790)	(6,625)	(9,282)
Net cash provided by operating activities	209,217	185,459	128,535
Cash flows from investing activities:			
Purchases of property, plant and equipment	(13,792)	(29,728)	(6,472)
Purchases of marketable securities	(567,947)	(909,852)	(657,433)
Maturities of marketable securities	336,154	817,834	507,385
Proceeds from sale of marketable securities	227,045	25,304	6,758
Proceeds from divestiture, net of cash disposed	—	—	76,039
Proceeds from sale of property and property, plant and equipment	—	—	29
Settlement of working capital adjustment from disposal of business	—	(1,131)	—
Investment in privately-held companies	—	—	(1,000)
Acquisition of businesses, net of cash acquired	(97,115)	—	(66,780)
Net cash used in investing activities	(115,655)	(97,573)	(141,474)
Cash flows from financing activities:			
Proceeds received from issuance of common stock under employee stock plans	8,957	11,487	15,104
Payments of taxes on restricted stock units	(10,613)	(9,403)	(7,023)
Payments under installment payment arrangements	(12,472)	(13,201)	(8,379)
Repurchase and retirement of common stock, including prepayment under accelerated share repurchase program	(100,081)	(50,069)	—
Net cash used in financing activities	(114,209)	(61,186)	(298)
Effect of exchange rate changes on cash and cash equivalents	(413)	106	(497)
Net increase (decrease) in cash, cash equivalents and restricted cash	(21,060)	26,806	(13,734)
Cash, cash equivalents and restricted cash at beginning of year	129,324	102,518	116,252
Cash, cash equivalents and restricted cash at end of year	$ 108,264	$ 129,324	$ 102,518

	Years Ended December 31,		
	2021	2020	2019
	(In thousands)		
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	$ 2,372	$ 2,372	$ 2,372
Income taxes, net of refunds	$ 22,839	$ 21,312	$ 17,835
Non-cash investing and financing activities:			
Property, plant and equipment received and accrued in accounts payable and other liabilities	$ 12,935	$ 20,952	$ 29,844

	As of December 31,		
	2021	2020	2019
		(In thousands)	
Reconciliation of the cash, cash equivalents and restricted cash balances as shown on the consolidated statement of cash flows:			
Cash and cash equivalents	$ 107,891	$ 128,967	$ 102,176
Restricted cash	373	357	342
Cash, cash equivalents and restricted cash	$ 108,264	$ 129,324	$ 102,518

Refer to Notes to Consolidated Financial Statements

RAMBUS INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Formation and Business of the Company

Rambus Inc. (“Rambus” or the “Company”) 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.

Rambus produces products and innovations that address the fundamental challenges of accelerating data. The Company makes industry-leading chips and IP that enable critical performance improvements for data center and other growing markets. The ongoing shift to the cloud, along with the widespread advancement of artificial intelligence (“AI”) across the data center, edge and Internet of Things (“IoT”) end points, has led to exponential growth in data usage and tremendous demands on data infrastructure. Creating fast and safe connections, both in and across systems, remains one of the most mission-critical design challenges limiting performance in advanced hardware for these markets.

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 on 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.

Immaterial Correction of Prior-Period Error

Subsequent to the reissuance of the consolidated financial statements as of and for the year ended December 31, 2020, the Company determined that $7.2 million in corporate investments originally classified as cash equivalents should have been classified as marketable securities in the consolidated balance sheet as of December 31, 2020. The Company assessed the effect of this correction based on an analysis of both quantitative and qualitative factors and determined that the correction was not material. Accordingly, the Company corrected the error as of and for the year ended December 31, 2020 in the accompanying consolidated balance sheet, consolidated statement of cash flows and related footnotes. The following adjustments were made:

- Cash and cash equivalents as of December 31, 2020 originally reported as $136.1 million was corrected to $129.0 million.
- Marketable securities as of December 31, 2020 originally reported as $366.5 million was corrected to $373.7 million.
- Correction of Note 8, “Marketable Securities” and Note 9, “Fair Value of Financial Instruments,” to reflect the above adjustments.
- Corrected its presentation of net cash used in investing activities for the year ended December 31, 2020, which was originally reported as $90.4 million, to reflect cash used in investing activities of $97.6 million, in the accompanying consolidated statement of cash flows. The corrections did not affect the net cash provided by operating activities nor net cash used in financing activities.

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 (loss) or cash flows for any of the periods presented.

Revenue Recognition

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. Substantially 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 price basis. The Company has established standalone selling prices for all of its offerings - specifically, the 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.

The Company's revenue consists of product, royalty and contract and other revenue. Products primarily consist of memory interface chips sold directly and indirectly to module manufacturers and OEMs worldwide through multiple channels, including its direct sales force and distributors. Royalty revenue consists of patent and technology license royalties. Contract and other revenue consists of software license fees, engineering fees associated with integration of the Company's technology solutions into its customers' products and support and maintenance fees.

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.

Royalty Revenue

Rambus' patent and technology licensing arrangements generally range between one year and ten years in duration and generally grant the licensee the right to use the Company's entire intellectual property ("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), 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 5%, with the related interest income 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 Accounting Standards Update ("ASU") No. 2014-09, Revenue from Contracts with Customers in Accounting Standards Codification ("ASC") Topic 606 ("ASC 606") 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 recorded when the Company receives the actual royalty report from the licensee.

Contract and Other Revenue

Contract and other revenue consists of software license fees and engineering fees associated with integration of the Company's technology solutions into its customers' 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 license and customization services revenue based on an over time model, measured using the input method. License and customization services revenue is reported as part of contract and other revenue which was approximately $7.5 million for the year ended December 31, 2021. Due to the nature of the work performed in these arrangements, the estimation of the over time model is complex and involves significant judgment. The key factor reviewed by management to estimate costs to complete each contract is the estimated man-months necessary to complete the project. The Company recognizes license renewal revenue at the beginning of the renewal period.

Significant Judgments

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

- The Company has adequate tools and controls in place, and substantial experience and expertise in timely and accurately tracking man-months incurred in completing customization and other professional services, and quantifying changes in estimates.

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

- For fixed-fee arrangements in which cash is being received over a period exceeding a year, 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.

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. The contract assets are transferred to receivables when the billing occurs.

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 existing technology, write-down of inventories, amortization of production mask costs, overhead and an allocated portion of occupancy costs.

Leases

The Company adopted the New Leasing Standard as of January 1, 2019 using the alternative transition method provided by ASU No. 2018-11 and did not recast comparative periods. The Company elected the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allowed the Company to carry forward the historical lease classification. Additionally, the Company elected the practical expedient related to non-lease components and made the policy election for the short-term leases exemptions. The Company used its incremental borrowing rate to measure the lease liabilities at the adoption date for its existing operating leases that commenced prior to January 1, 2019, which was based on the remaining lease term and remaining lease payments for such leases.

The Company leases office space, domestically and internationally, under operating leases. The Company's leases have remaining lease terms generally between one year and nine years. Operating leases are included in operating lease right-of-use ("ROU") assets, operating lease liabilities, and long-term operating lease liabilities on the Company's consolidated balance sheets. The Company does not have any finance leases. The Company determines if an arrangement is a lease, or contains a lease, at inception. The Company assesses all relevant facts and circumstances in making the determination of the existence of a lease. For leases with terms greater than 12 months, the Company records the related asset and obligation at the present value of lease payments over the term. The Company uses its incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments, and uses the implicit rate when readily determinable. Many of the Company's leases include rental escalation clauses, renewal options and/or termination options that are factored into the determination of lease payments when appropriate. Leases with an initial term of 12 months or less are not recorded on the balance sheet, and the Company does not separate non-lease components from lease components. Operating lease costs are included in research and development and selling, general and administrative costs on the statement of operations.

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. 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.

When goodwill is assessed for impairment, the Company has the option to perform an assessment of qualitative factors of impairment (optional assessment) prior to necessitating a quantitative impairment test. Should the optional assessment be used for any given year, qualitative factors to consider for a reporting unit include: cost factors; financial performance; legal, regulatory, contractual, political, business, or other factors; entity specific factors; industry and market considerations; macroeconomic conditions; and other relevant events and factors affecting the reporting unit. If the Company determines in the qualitative assessment that it is more likely than not that the fair value of the reporting unit is less than its carrying value, a quantitative test is then performed. Otherwise, no further testing is required. For a reporting unit tested using a quantitative approach, the Company compares the fair value of the reporting unit with the carrying amount of the reporting unit, including goodwill. The fair value of the reporting unit is estimated using an income approach.

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, 2021 and determined that there was no impairment of its goodwill. For the years ended December 31, 2020 and 2019, the Company did not recognize any goodwill impairment charges.

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 six months to ten years.

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 software, computer equipment, leasehold improvements, machinery, and furniture and fixtures. Computer software, computer equipment, machinery, and furniture and fixtures are stated at cost and generally depreciated on a straight-line basis over an estimated useful life of three years, three years, seven years, and three years, respectively. Refer to Note 11, Balance Sheet Details," 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 2021, 2020 and 2019, the Company did not recognize any impairment of its definite-lived and indefinite-lived assets.

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 on the Company's 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 ("BSM") 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 the years ended December 31, 2021, 2020 and 2019 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, 2021 and 2020. 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.

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 the Company's 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. The Company 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 on the consolidated statements of comprehensive income (loss).

Credit Concentration

As of December 31, 2021 and 2020, 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. Refer to Note 12, Convertible Notes,” for further details.

The Company’s accounts receivable are derived from revenue earned from customers located in the U.S. and internationally. Refer to Note 7, Segments and Major Customers,” for further details.

The Company’s unbilled receivables are collected from customers located in the U.S. and internationally. Refer to Note 4, Revenue Recognition,” 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) on 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 rates. Additionally, foreign currency transaction gains and losses are included in interest income and other (income) expense, net, on 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. 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 on 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. On July 2, 2021, the Company completed the acquisition of AnalogX, Inc. and applied significant judgment in estimating the fair value of the existing technology and IPR&D intangible assets from the acquisition, which involved the use of significant assumptions related to cost of labor to recreate the intangible assets. On August 18, 2021, the Company completed the acquisition of PLDA Group and applied significant judgment in estimating the fair value of the existing technology and IPR&D intangible assets from the acquisition, which involved the use of significant assumptions related to revenue growth rates and discount rates. Unanticipated events and circumstances may occur that may affect the accuracy or validity of such assumptions, estimates or actual results.

Litigation

The Company 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 the Company believes that a loss arising from such matters is probable and can be reasonably estimated, the Company records the estimated liability on its consolidated financial statements. If only a range of estimated losses can be determined, the Company 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, the Company records the low end of the range. Any such accrual would be charged to expense in the appropriate period. The Company recognizes litigation expenses in the period in which the litigation services were provided.

3. Recent Accounting Pronouncements

Recent Accounting Pronouncements Adopted

In January 2020, the Financial Accounting Standards Board ("FASB") issued ASU No. 2020-01, "Investments—Equity Securities (Topic 321), Investments—Equity Method and Joint Ventures (Topic 323), and Derivatives and Hedging (Topic 815)." The amendments in this ASU clarify the interaction of the accounting for equity securities under Topic 321 and investments accounted for under the equity method of accounting in Topic 323 and the accounting for certain forward contracts and purchased options accounted for under Topic 815. This ASU is effective for interim and annual reporting periods beginning after December 15, 2020. The Company adopted this ASU on January 1, 2021 on a prospective basis. The adoption of this ASU did not have a material impact on the Company's consolidated financial statements.

Recent Accounting Pronouncements Not Yet Adopted

In October 2021, the FASB issued ASU No. 2021-08, "Business Combinations (Topic 805)—Accounting for Contract Assets and Contract Liabilities from Contracts with Customers." The amendments in this ASU improve the accounting for acquired revenue contracts with customers in a business combination by addressing diversity in practice and inconsistencies related to recognition of an acquired contract liability, and to payment terms and their effect on subsequent revenue recognized by the acquirer. Among other changes, this ASU requires that an acquirer account for acquired revenue contracts in accordance with Topic 606 as if it had originated the contracts. If the acquirer is unable to assess or rely on how the acquiree applied Topic 606, the acquirer should consider the terms of the acquired contracts as of the contract inception or contract modification date in applying Topic 606 to determine what should be recorded at the acquisition date. The amendments also provide certain practical expedients for acquirers when recognizing and measuring acquired contract assets and contract liabilities from revenue contracts in a business combination. The guidance is effective for fiscal years beginning after December 15, 2022, with early adoption permitted. The Company is currently evaluating the impact that the adoption of this guidance will have on its consolidated financial statements.

In August 2020, the FASB issued ASU No. 2020-06, "Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging - Contracts in Entity's Own Equity (Subtopic 815-40)." The amendments in this ASU simplify the accounting for certain financial instruments with characteristics of liabilities and equity, including convertible instruments and contracts in an entity's own equity. Among other changes, the guidance removes the liability and equity separation models for convertible instruments. Instead, entities will account for convertible debt instruments wholly as debt unless convertible instruments contain features that require bifurcation as a derivative or that result in substantial premiums accounted for as paid-in capital. The guidance also requires the application of the if-converted method to calculate the impact of convertible instruments on diluted earnings per share. The guidance is effective for fiscal years beginning after December 15, 2021, with early adoption permitted for fiscal years beginning after December 15, 2020, and can be adopted on either a retrospective or modified retrospective basis. The Company will adopt this guidance on January 1, 2022 on modified retrospective basis. Although the Company continues to evaluate the impact of this guidance on its consolidated financial statements, upon adoption, the Company expects this guidance will result in a reclassification of the conversion feature balances from additional paid-in capital to debt and in a decrease of reported interest expense for its convertible notes.

4. Revenue Recognition

Contract Balances

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, 2021.

The Company's contract balances were as follows:

(In thousands)	As of December 31, 2021	2020
Unbilled receivables	$ 258,626	$ 375,512
Deferred revenue	26,198	10,461

During the years ended December 31, 2021 and December 31, 2020, the Company recognized $10.2 million and $10.3 million, respectively, of revenue that was included in the contract balances as of December 31, 2020 and December 31, 2019, respectively.

Remaining Performance Obligations

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 $29.6 million as of December 31, 2021, which the Company primarily expects to recognize over the next 2 years.

5. Earnings (Loss) Per Share

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

(In thousands, except per share amounts)	For the Years Ended December 31, 2021	2020	2019
Net income (loss) per share:			
Numerator:			
Net income (loss)	$ 18,334	$ (40,471)	$ (85,964)
Denominator:			
Weighted-average common shares outstanding - basic	110,538	113,254	110,948
Effect of potential dilutive common shares	4,327	—	—
Weighted-average common shares outstanding - diluted	114,865	113,254	110,948
Basic net income (loss) per share	$ 0.17	$ (0.36)	$ (0.77)
Diluted net income (loss) per share	$ 0.16	$ (0.36)	$ (0.77)

For the years ended December 31, 2020 and 2019, options to purchase approximately 0.3 million and 1.0 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 year ended December 31, 2021, there were no options to purchase shares that were excluded from the calculation.

For the years ended December 31, 2020 and 2019, an additional 2.3 million and 2.4 million shares, respectively, were 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. 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

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. During the year ended December 31, 2021, the Company's stock price exceeded the 2023 Notes' conversion price of $18.93 per share, due to which approximately 1.4 million shares for the year ended December 31, 2021 were included in the weighted-average dilutive shares. Refer to Note 12, Convertible Notes," for more details.

6. Intangible Assets and Goodwill

Goodwill

The following tables present goodwill information for the years ended December 31, 2021 and December 31, 2020:

(In thousands)	December 31, 2020	Additions to Goodwill [1]	December 31, 2021
Total goodwill	$ 183,222	$ 95,588	$ 278,810

[1] In July 2021, the Company acquired AnalogX and in August 2021, the Company acquired PLDA, which resulted in the Company recognizing additional goodwill. Refer to Note 21, "Acquisitions," for additional information.

	As of December 31, 2021		
(In thousands)	Gross Carrying Amount	Accumulated Impairment Losses	Net Carrying Amount
Total goodwill	$ 300,580	$ (21,770)	$ 278,810

(In thousands)	December 31, 2019	Adjustment to Goodwill [1]	December 31, 2020
Total goodwill	$ 183,465	$ (243)	$ 183,222

[1] Working capital adjustments related to the acquisition of Northwest Logic, Inc. ("Northwest Logic").

	As of December 31, 2020		
(In thousands)	Gross Carrying Amount	Accumulated Impairment Losses	Net Carrying Amount
Total goodwill	$ 204,992	$ (21,770)	$ 183,222

Intangible Assets, Net

The components of the Company's intangible assets as of December 31, 2021 and December 31, 2020 were as follows:

		As of December 31, 2021		
(In thousands, except useful life)	Useful Life	Gross Carrying Amount [1]	Accumulated Amortization [1]	Net Carrying Amount
Existing technology	3 to 10 years	$ 292,058	$ (247,422)	$ 44,636
Customer contracts and contractual relationships	0.5 to 10 years	37,793	(35,209)	2,584
Non-compete agreements and trademarks	3 years	300	(300)	—
IPR&D	Not applicable	11,200	—	11,200
Total intangible assets		$ 341,351	$ (282,931)	$ 58,420

[1] In July 2021, the Company acquired AnalogX and in August 2021, the Company acquired PLDA, which resulted in the Company recognizing additional intangible assets. Refer to Note 21, "Acquisitions," for additional information.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

(In thousands, except useful life)	Useful Life	As of December 31, 2020 Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Existing technology	3 to 10 years	$ 263,789	$ (230,950)	$ 32,839
Customer contracts and contractual relationships	0.5 to 10 years	36,293	(34,245)	2,048
Non-compete agreements and trademarks	3 years	300	(300)	—
IPR&D	Not applicable	1,600	—	1,600
Total intangible assets		$ 301,982	$ (265,495)	$ 36,487

Amortization expense for intangible assets for the years ended December 31, 2021, 2020, and 2019 was $17.5 million, $18.4 million, and $17.1 million, respectively.

The estimated future amortization expense of intangible assets as of December 31, 2021 was as follows (in thousands):

Years Ending December 31:	Amount
2022	$ 14,507
2023	13,491
2024	11,180
2025	5,180
2026	2,862
Thereafter	—
Total amortizable purchased intangible assets	47,220
IPR&D	11,200
Total intangible assets	$ 58,420

7. 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 has determined its CODM to be the Chief Executive Officer ("CEO"). The CEO reviews financial information presented on a consolidated basis for purposes of managing the business, allocating resources, making operating decisions and assessing financial performance. On this basis, the Company is organized and operates as a single segment within the semiconductor space. As of December 31, 2021, the Company has a single operating and reportable segment. Accordingly, no additional disclosure of segment measures of profit or loss or total assets is applicable for all periods presented.

Accounts receivable from the Company's major customers representing 10% or more of total accounts receivable at December 31, 2021 and 2020, respectively, was as follows:

Customer	As of December 31, 2021	2020
Customer 1	19 %	13 %
Customer 2	17 %	*
Customer 3	*	14 %
Customer 4	*	11 %

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

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Revenue from the Company's major customers representing 10% or more of total revenue for the years ended December 31, 2021, 2020 and 2019, respectively, was as follows:

	Years Ended December 31,		
Customer	**2021**	**2020**	**2019**
Customer A	21 %	12 %	*
Customer B	13 %	*	*
Customer C	11 %	15 %	10 %
Customer D	*	*	14 %

* Customer accounted for less than 10% of total revenue in the period.

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

	Years Ended December 31,		
(In thousands)	**2021**	**2020**	**2019**
USA	$ 211,419	$ 137,614	$ 134,526
Singapore	39,798	28,034	21,751
Asia-Other	28,949	26,249	14,356
Taiwan	23,953	21,803	24,118
Japan	14,894	20,437	15,453
South Korea	6,007	3,664	3,583
Europe	3,165	7,359	10,262
Canada	119	1,162	3,554
Total	$ 328,304	$ 246,322	$ 227,603

At December 31, 2021, of the $56.0 million of total property, plant and equipment, approximately $49.8 million were located in the United States, $3.2 million were located in India and $3.0 million were located in other foreign locations. At December 31, 2020, of the $57.7 million of total property, plant and equipment, approximately $53.2 million were located in the United States, $3.3 million were located in India and $1.2 million were located in other foreign locations.

8. 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.

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

	As of December 31, 2021				
(In thousands)	**Fair Value**	**Amortized Cost**	**Gross Unrealized Gains**	**Gross Unrealized Losses**	**Weighted Rate of Return**
Money market funds	$ 7,402	$ 7,402	$ —	$ —	0.02 %
U.S. Government bonds and notes	102,812	103,113	—	(301)	0.29 %
Corporate notes, bonds and commercial paper	287,905	288,667	8	(770)	0.22 %
Total cash equivalents and marketable securities	398,119	399,182	8	(1,071)	
Cash	87,490	87,490	—	—	
Total cash, cash equivalents and marketable securities	$ 485,609	$ 486,672	$ 8	$ (1,071)	

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

(In thousands)	As of December 31, 2020 Fair Value	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Weighted Rate of Return
Money market funds	$ 18,162	$ 18,162	$ —	$ —	0.01 %
U.S. Government bonds and notes	169,633	169,670	3	(40)	0.12 %
Corporate notes, bonds and commercial paper	253,391	253,412	61	(82)	0.20 %
Total cash equivalents and marketable securities	441,186	441,244	64	(122)	
Cash	61,463	61,463	—	—	
Total cash, cash equivalents and marketable securities	$ 502,649	$ 502,707	$ 64	$ (122)	

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

(In thousands)	As of December 31, 2021	2020
Cash equivalents	$ 20,401	$ 67,504
Short-term marketable securities	377,718	373,682
Total cash equivalents and marketable securities	398,119	441,186
Cash	87,490	61,463
Total cash, cash equivalents and marketable securities	$ 485,609	$ 502,649

The Company continues to invest in highly rated and highly liquid debt securities. 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.

The estimated fair value and gross unrealized losses 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, 2021 and 2020 are as follows:

(In thousands)	Fair Value December 31, 2021	Fair Value December 31, 2020	Gross Unrealized Loss December 31, 2021	Gross Unrealized Loss December 31, 2020
Less than 12 months				
U.S. Government bonds and notes	$ 82,822	$ 70,548	$ (301)	$ (40)
Corporate notes, bonds and commercial paper	255,783	181,349	(770)	(82)
Total cash equivalents and marketable securities in a continuous unrealized loss position	$ 338,605	$ 251,897	$ (1,071)	$ (122)

The gross unrealized losses at December 31, 2021 and 2020 were not material in relation to the Company's total available-for-sale portfolio. The gross unrealized losses 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, bonds and commercial paper. The Company reasonably believes that there is no need to sell these investments and 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.

The contractual maturities of cash equivalents (excluding money market funds which have no maturity) and marketable securities are summarized as follows:

(In thousands)		December 31, 2021
Due less than one year	$	222,641
Due from one year through three years		168,076
Total	$	390,717

Refer to Note 9, Fair Value of Financial Instruments," for discussion regarding the fair value of the Company's cash equivalents and marketable securities.

9. 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 on 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 that 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.

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.

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 Company does not have any financial assets or liabilities in Level 3 as of December 31, 2021 and 2020, except for the Company's liability for the contingent earn-out consideration related to the PLDA acquisition. The Company has classified this liability within Level 3 of the fair value hierarchy because the fair value is determined using significant unobservable inputs. Refer to Note 21, "Acquisitions**,**" for further details.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

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, 2021 and 2020:

	As of December 31, 2021			
(In thousands)	Total	Quoted Market Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market funds	$ 7,402	$ 7,402	$ —	$ —
U.S. Government bonds and notes	102,812	—	102,812	—
Corporate notes, bonds and commercial paper	287,905	—	287,905	—
Total available-for-sale securities	$ 398,119	$ 7,402	$ 390,717	$ —

	As of December 31, 2020			
(In thousands)	Total	Quoted Market Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market funds	$ 18,162	$ 18,162	$ —	$ —
U.S. Government bonds and notes	169,633	—	169,633	—
Corporate notes, bonds and commercial paper	253,391	—	253,391	—
Total available-for-sale securities	$ 441,186	$ 18,162	$ 423,024	$ —

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" on the consolidated statement of operations. During the years ended December 31, 2021 and 2020, 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, 2021 and December 31, 2020, the carrying value of the Company's 25.0% ownership percentage was $1.8 million and $2.8 million, respectively, which were included in other assets on the accompanying consolidated balance sheets. The Company recorded immaterial amounts on its consolidated statements of operations representing its share of the investee's loss for the years ended December 31, 2021, 2020 and 2019.

During the years ended December 31, 2021 and 2020, 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, 2021 and 2020:

	As of December 31, 2021			As of December 31, 2020		
(In thousands)	Face Value	Carrying Value	Fair Value	Face Value	Carrying Value	Fair Value
1.375% Convertible Senior Notes due 2023 (the "2023 Notes")	$ 172,500	$ 163,687	$ 254,103	$ 172,500	$ 156,031	$ 194,709

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 12, "Convertible Notes," as of December 31, 2021, the convertible notes were 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, approximated fair value due to their short maturities.

Information regarding the Company’s goodwill and long-lived assets balances are disclosed in Note 6, Intangible Assets and Goodwill.”

10. Leases

On July 8, 2019, the Company entered into a definitive triple net space lease agreement with 237 North First Street Holdings, LLC (the “Landlord”), whereby the Company leases office space located at 4453 North First Street in San Jose, California, (the “Lease”). In April 2020, the lease was amended for certain terms (the “Amended Lease”). The Amended Lease includes approximately 90,000 square feet of office space, which serves as the Company’s corporate headquarters and includes engineering, sales, marketing and administrative functions. The Amended Lease has a term of 128 months from the amended commencement date in April 2020. The starting rent of the Amended Lease was approximately $3.26 per square foot on a triple net basis. The annual base rent increases each year to certain fixed amounts over the course of the term as set forth in the Amended Lease and will be $4.38 per square foot in the final year of the Amended Lease term. In addition to the base rent, the Company will also pay operating expenses, insurance expenses, real estate taxes, and a management fee under the Amended Lease. The Amended Lease also allows for an option to expand, wherein the Company has the right of first refusal to rent additional space in the building. The Company has a one-time option to extend the Amended Lease for a period of 60 months and may elect to terminate the Amended Lease, via written notice to the Landlord, in the event the office space is damaged or destroyed. Total required payments under the Amended Lease are approximately $41 million. Pursuant to the terms of the Amended Lease, the landlord agreed to reimburse the Company up to $9.0 million related to a tenant improvement allowance. During the year ended December 31, 2021, the Company received approximately $9.0 million from the landlord in total reimbursements related to the tenant improvement allowance.

The table below reconciles the undiscounted cash flows for the first five years and total of the remaining years to the operating lease liabilities recorded on the consolidated balance sheet as of December 31, 2021 (in thousands):

Years ending December 31,	Amount
2022	$ 7,505
2023	4,705
2024	4,060
2025	4,178
2026	4,299
Thereafter	17,429
Total minimum lease payments	42,176
Less: amount of lease payments representing interest	(7,085)
Present value of future minimum lease payments	35,091
Less: current obligations under leases	(5,992)
Long-term lease obligations	$ 29,099

As of December 31, 2021, the weighted-average remaining lease term for the Company’s operating leases was 7.9 years, and the weighted-average discount rate used to determine the present value of the Company’s operating leases was 4.5%.

Operating lease costs included in research and development and selling, general and administrative costs on the statements of operations were $7.4 million and $9.5 million for the years ended December 31, 2021 and 2020, respectively.

Cash paid for amounts included in the measurement of operating lease liabilities were $7.8 million and $7.2 million for the years ended December 31, 2021 and 2020, respectively.

11. Balance Sheet Details

Inventories

Inventories consisted of the following:

(In thousands)	As of December 31, 2021	As of December 31, 2020
Raw materials	$ 3,879	$ 7,945
Work in process	1,536	650
Finished goods	3,067	5,871
Total	$ 8,482	$ 14,466

Property, Plant and Equipment, net

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

(In thousands)	As of December 31, 2021	As of December 31, 2020
Computer software	$ 51,922	$ 49,862
Computer equipment	34,484	32,122
Leasehold improvements	34,120	9,658
Machinery	14,840	10,378
Furniture and fixtures	13,328	11,100
Construction in progress	1,813	27,250
Property, plant and equipment, gross	150,507	140,370
Less accumulated depreciation and amortization	(94,472)	(82,677)
Property, plant and equipment, net	$ 56,035	$ 57,693

Depreciation expense for the years ended December 31, 2021, 2020 and 2019 was $21.0 million, $22.1 million and $15.3 million, respectively.

Accumulated Other Comprehensive Gain (Loss)

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

(In thousands)	As of December 31, 2021	As of December 31, 2020
Foreign currency translation adjustments	$ (237)	$ 129
Unrealized loss on available-for-sale securities, net of tax	(1,215)	(210)
Total	$ (1,452)	$ (81)

12. Convertible Notes

The Company’s convertible notes are shown in the following table:

(In thousands)	As of December 31, 2021	As of December 31, 2020
2023 Notes	$ 172,500	$ 172,500
Unamortized discount — 2023 Notes	(8,266)	(15,420)
Unamortized debt issuance costs — 2023 Notes	(547)	(1,049)
Total convertible notes	163,687	156,031
Less current portion	163,687	—
Total long-term convertible notes	$ —	$ 156,031

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 the 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 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; 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 on 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 on 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

(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 on 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. During the year ended December 31, 2021, the Company's stock price exceeded the 2023 Notes' conversion price of $18.93 per share, due to which approximately 1.4 million shares for the year ended December 31, 2021 were included in the weighted-average dilutive shares. 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.

In December 2021, the trigger for early conversion of the 2023 Notes was met as the last reported sale price of the Company's common stock exceeded 130% of the conversion price of the 2023 Notes for more than 20 trading days during the 30 consecutive trading days ended December 31, 2021. As a result, the 2023 Notes will be convertible at the option of the holders during the first quarter of 2022, and the net carrying amount of the 2023 Notes was reclassified to current liabilities on the consolidated balance sheet as of December 31, 2021.

Interest expense related to the notes for the years ended December 31, 2021, 2020 and 2019 was as follows:

	Years Ended December 31,		
(In thousands)	**2021**	**2020**	**2019**
2023 Notes coupon interest at a rate of 1.375%	$ 2,372	$ 2,372	$ 2,372
2023 Notes amortization of discount and debt issuance cost at an additional effective interest rate of 4.9%	7,656	7,243	6,854
Total interest expense on convertible notes	$ 10,028	$ 9,615	$ 9,226

13. Commitments and Contingencies

As of December 31, 2021, the Company's material contractual obligations were as follows:

(In thousands)	**Total**	**2022**	**2023**	**2024**	**2025**	**2026**
Contractual obligations (1) (2) (3)						
Software licenses (4)	$ 16,348	$ 11,597	$ 3,274	$ 1,477	$ —	$ —
Acquisition retention bonuses (5)	9,528	5,194	2,167	2,167	—	—
Convertible notes (6)	172,500	—	172,500	—	—	—
Interest payments related to convertible notes	3,564	2,372	1,192	—	—	—
Total	$ 201,940	$ 19,163	$ 179,133	$ 3,644	$ —	$ —

(1) The above table does not reflect possible payments in connection with unrecognized tax benefits of approximately $20.2 million including $18.9 million recorded as a reduction of long-term deferred tax assets and $1.3 million in long-term income taxes payable, as of December 31, 2021. As noted below in Note 19, 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.

(2) For the Company's lease commitments as of December 31, 2021, refer to Note 10, Leases."

(3) The Company's other contractual obligations as of December 31, 2021 were not material.

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

(5) In connection with the acquisitions of Northwest Logic in the third quarter of 2019 and the Secure Silicon IP and Protocols business in the fourth quarter of 2019, and the acquisitions of AnalogX and PLDA in the third quarter of 2021, the Company is obligated to pay retention bonuses to certain employees subject to certain eligibility and acceleration provisions including the condition of employment.

(6) 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. Refer to Note 12, Convertible Notes," for additional details.

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 IP 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 may not always be possible. The fair value of the liability as of December 31, 2021 and 2020 was not material.

14. Equity Incentive Plans and Stock-Based Compensation

Equity Incentive Plans

The Company has three equity incentive plans under which grants are currently outstanding: the 2006 Equity Incentive Plan (the "2006 Plan"), the 2015 Equity Incentive Plan (the "2015 Plan") and the 2019 Inducement Equity Incentive Plan (the "2019 Inducement Plan"). On April 23, 2015, the Company's stockholders approved the 2015 Plan, which replaced the 2006 Plan. Additionally, in the third quarter of 2019, the Company adopted the 2019 Inducement Plan and, subject to the adjustment provisions of the 2019 Inducement Plan, reserved 400,000 shares of the Company's common stock for issuance pursuant to equity awards granted under the 2019 Inducement Plan. The 2015 Plan and 2019 Inducement Plan were the Company's only plans for providing stock-based incentive awards to eligible employees, executive officers, non-employee directors and consultants as of December 31, 2021. 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 2019 Inducement Plan provides for the grant of equity-based awards, including nonstatutory stock options, restricted stock units, restricted stock, stock appreciation rights, performance shares and performance units, and its terms are substantially similar to the Company's 2015 Plan. However, awards under the 2019 Inducement Plan may only be granted to individuals who previously have not been employees or non-employee directors of the Company (or who will become employed following a bona fide period of non-employment or service with the Company), as an inducement material to the individuals' entry into employment with the Company, or, to the extent permitted by Rule 5635(c)(3) of the Nasdaq Listing Rules, in connection with a merger or acquisition.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

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

	Shares Available for Grant
Total shares available for grant as of December 31, 2018	10,074,046
Increase in shares approved for issuance (1)	400,000
Stock options granted	(80,000)
Stock options forfeited	426,960
Nonvested equity stock and stock units granted (2) (3)	(7,261,845)
Nonvested equity stock and stock units forfeited (2)	3,267,702
Total shares available for grant as of December 31, 2019	6,826,863
Increase in shares approved for issuance (4)	7,800,000
Stock options granted	(40,000)
Stock options forfeited	101,816
Nonvested equity stock and stock units granted (2) (5)	(3,528,401)
Nonvested equity stock and stock units forfeited (2)	1,252,042
Total shares available for grant as of December 31, 2020	12,412,320
Stock options forfeited	54,327
Nonvested equity stock and stock units granted (2) (6)	(3,918,251)
Nonvested equity stock and stock units forfeited (2)	1,943,782
Total shares available for grant as of December 31, 2021	10,492,178

(1) Shares were reserved under the 2019 Inducement Plan adopted in the third quarter of 2019.

(2) For purposes of determining the number of shares available for grant under the 2015 Plan against the maximum 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.

(3) Amount includes approximately 1.0 million 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.

(4) On April 30, 2020, the Company's stockholders approved an additional 7,800,000 shares for issuance under the 2015 Plan.

(5) Amount includes approximately 0.5 million 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.

(6) Amount includes approximately 0.4 million shares that have been reserved for potential future issuance related to certain performance unit awards granted in the first quarter of 2021 and 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 Company's equity incentive plans for the years ended December 31, 2021, 2020 and 2019 and information regarding stock options outstanding, exercisable, and vested and expected to vest as of December 31, 2021:

	Options Outstanding				
(In thousands, except per share amounts and years)	**Number of Shares**	**Weighted-Average Exercise Price Per Share**		**Weighted-Average Remaining Contractual Term (years)**	**Aggregate Intrinsic Value**
Outstanding as of December 31, 2018	3,235,891	$	10.25		
Options granted	80,000	$	13.25		
Options exercised	(1,249,785)	$	7.79		
Options forfeited	(426,960)	$	13.71		
Outstanding as of December 31, 2019	1,639,146	$	11.37		
Options granted	40,000	$	15.59		
Options exercised	(613,119)	$	10.74		
Options forfeited	(101,816)	$	19.41		
Outstanding as of December 31, 2020	964,211	$	11.08		
Options granted	—	$	—		
Options exercised	(360,303)	$	11.06		
Options forfeited	(54,327)	$	14.98		
Outstanding as of December 31, 2021	549,581	$	10.71	4.3	$ 10,265
Vested or expected to vest at December 31, 2021	549,397	$	10.71	4.3	$ 10,262
Options exercisable at December 31, 2021	500,826	$	10.48	4.0	$ 9,472

Employee Stock Purchase Plan

During the years ended December 31, 2021, 2020, and 2019, the Company had one employee stock purchase plan, the 2015 Employee Stock Purchase Plan ("2015 ESPP"). Employees generally will be eligible to participate in the plan if they are employed by the Company 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 384,087 shares at a price of $12.95 per share during the year ended December 31, 2021. The Company issued 467,065 shares at a price of $10.51 per share during the year ended December 31, 2020. The Company issued 629,438 shares at a price of $8.53 per share during the year ended December 31, 2019. On April 30, 2020, the Company's stockholders approved an additional 2,000,000 shares to be reserved for issuance under the 2015 ESPP. As of December 31, 2021, 2.8 million shares under the ESPP remained available for issuance.

Stock-Based Compensation

Stock Options

There were no stock options granted during the year ended December 31, 2021. During the years ended December 31, 2020 and 2019, the number of stock options granted were not material.

During the years ended December 31, 2021, 2020 and 2019, the Company recorded stock-based compensation related to stock options of $0.4 million, $0.6 million and $1.0 million, respectively.

As of December 31, 2021, there was $0.4 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 1.4 years.

The total fair value of options vested for the years ended December 31, 2021, 2020 and 2019 was $2.0 million, $3.3 million and $6.7 million, respectively.

Employee Stock Purchase Plan

During the years ended December 31, 2021, 2020 and 2019, the Company recorded stock-based compensation related to the 2015 ESPP of $1.4 million, $1.5 million and $1.5 million, respectively.

As of December 31, 2021, there was $0.6 million of total unrecognized compensation cost related to stock-based compensation arrangements granted under the 2015 ESPP. That cost is expected to be recognized over four months.

Valuation Assumptions

The Company estimates the fair value of stock awards using the BSM model. The BSM model determines the fair value of stock-based compensation and is affected by the Company's 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 the Company's 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 table below.

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 December 31,	
	2020	2019
Stock Option Plan		
Expected stock price volatility	38%	33%-36%
Risk free interest rate	0.2%	1.4%-1.6%
Expected term (in years)	5.5	5.1-5.2
Weighted-average fair value of stock options granted	$5.46	$4.36

There were no stock options granted during the year ended December 31, 2021.

	Employee Stock Purchase Plan for Years Ended December 31,		
	2021	2020	2019
Employee Stock Purchase Plan			
Expected stock price volatility	32%-33%	37%-46%	32%
Risk free interest rate	0.04%-0.05%	0.1%	1.6%-2.4%
Expected term (in years)	0.5	0.5	0.5
Weighted-average fair value of purchase rights granted under the purchase plan	$5.17	$3.46	$3.13

Expected Stock Price Volatility: Given the volume of market activity in its market traded options, the Company 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: The Company 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 the Company's stock-based awards do not correspond with the terms for which interest rates are quoted, the Company 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, employees and directors. For the years ended December 31, 2021, 2020 and 2019, the Company granted nonvested equity stock units totaling 2.4 million, 2.0 million and 4.2 million shares, respectively. 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. For the years ended December 31, 2021, 2020 and 2019, the nonvested equity stock units were valued at the date of grant, giving them a fair value of approximately $50.1 million, $31.0 million and $43.0 million, respectively. During the years ended December 31, 2021, 2020 and 2019, the Company granted performance unit awards to certain Company executive officers with vesting subject to the achievement of certain performance and/or market 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 have been reduced to reflect the shares that could be earned at the maximum target.

For the years ended December 31, 2021, 2020 and 2019, the Company recorded stock-based compensation expense of approximately $25.7 million, $23.7 million and $23.9 million, respectively, related to all outstanding nonvested equity stock grants.

Unrecognized compensation cost related to all nonvested equity stock grants, net of estimated forfeitures, was approximately $43.0 million at December 31, 2021. This amount is expected to be recognized over a weighted-average period of 2.0 years.

The following table reflects the activity related to nonvested equity stock and stock units for the years ended December 31, 2021, 2020 and 2019:

Nonvested Equity Stock and Stock Units	Shares	Weighted-Average Grant-Date Fair Value
Nonvested at December 31, 2018	4,859,135	$ 12.71
Granted	4,233,701	$ 10.17
Vested	(1,896,283)	$ 12.40
Forfeited	(1,907,070)	$ 11.33
Nonvested at December 31, 2019	5,289,483	$ 11.27
Granted	1,986,117	$ 15.60
Vested	(1,693,659)	$ 11.70
Forfeited	(730,676)	$ 11.83
Nonvested at December 31, 2020	4,851,265	$ 12.82
Granted	2,363,885	$ 21.18
Vested	(1,524,950)	$ 12.41
Forfeited	(971,815)	$ 15.30
Nonvested at December 31, 2021	4,718,385	$ 16.62

15. Stockholders' Equity

Share Repurchase Programs

On October 29, 2020, the Board approved a new share repurchase program authorizing the repurchase of up to an aggregate of 20.0 million shares (the "2020 Repurchase Program"). Share repurchases under the 2020 Repurchase Program 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 2020 Repurchase Program. The 2020 Repurchase Program replaced the previous program approved by the Board in January 2015 and canceled the remaining shares outstanding as part of the previous authorization. During the years ended December 31, 2021 and 2020, the Company repurchased shares of its common stock under the 2020 Repurchase Program as discussed below.

On November 11, 2020, the Company entered into an accelerated share repurchase program with Deutsche Bank AG, London Branch as counterparty, through its agent Deutsche Bank Securities Inc. ("Deutsche Bank") (the "2020 ASR Program"). The 2020 ASR Program was part of the share repurchase program previously authorized by the Company's Board on October 29, 2020. Under the 2020 ASR Program, the Company pre-paid to Deutsche Bank the $50.0 million purchase price for its common stock and, in turn, the Company received an initial delivery of approximately 2.6 million shares of its common stock from Deutsche Bank in the fourth quarter of 2020, 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 2021, the accelerated share repurchase program was completed and the Company received an additional 0.1 million shares of its common stock, which were retired, as the final settlement of the accelerated share repurchase program.

On June 15, 2021, the Company entered into an accelerated share repurchase program with Deutsche Bank (the "2021 ASR Program"). The 2021 ASR Program was part of the share repurchase program previously authorized by the Board on October 29, 2020. Under the 2021 ASR Program, the Company pre-paid to Deutsche Bank the $100.0 million purchase price for its common stock and, in turn, the Company received an initial delivery of approximately 3.9 million shares of its common stock from Deutsche Bank in the second quarter of 2021, 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. During the fourth quarter of 2021, the accelerated share repurchase program was completed and the Company received an additional 0.4 million shares of its common stock, which were retired, as the final settlement of the accelerated share repurchase program.

During the year ended December 31, 2021, there were no other repurchases of the Company's common stock under the 2020 Repurchase Program.

As of December 31, 2021, there remained an outstanding authorization to repurchase approximately 12.9 million shares of the Company's outstanding common stock under the 2020 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, 2021, the cumulative price of $95.8 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. Refer to Note 12, 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. Refer to Note 12, Convertible Notes," for additional details.

16. Benefit Plans

The Company has a 401(k) 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. The Company, 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, 2021, 2020 and 2019, the Company made matching contributions totaling approximately $1.8 million, $1.8 million and $2.0 million, respectively.

17. Divestiture

During the second quarter of 2019, the Company entered into a share purchase agreement with Visa International Service Association (the "Purchaser"), pursuant to which the Purchaser agreed to acquire all of the outstanding shares of the Company's subsidiary, Smart Card Software Limited, which comprises the Company's Payments and Ticketing businesses, which was part of the Company's former Rambus Security Division ("RSD") segment. The decision to sell these businesses reflected the Company's ongoing review of its business to focus on products and offerings that are core to its semiconductor business.

The sale of the legal entities comprising the Company's Payments and Ticketing businesses was completed in October 2019. The final gross proceeds from the sale amounted to $82.5 million, which included the selling price of $75.0 million and approximately $7.5 million in net working capital adjustments finalized in October 2019. The $7.5 million in net working capital adjustments is net of a final working capital adjustment due to the buyer of approximately $1.1 million, which the Company paid in cash to the buyer during the first quarter of 2020. The final gross proceeds were offset by approximately $3.8 million in transaction costs for the year ended December 31, 2019.

The Company measured these businesses at the lower of their carrying value or fair value less any costs to sell, and recognized a cumulative impairment of approximately $7.4 million during the year ended December 31, 2019. In the second quarter of 2019, in order to determine the impairment loss, the Company performed a relative fair value measurement to allocate goodwill to the business units between the disposed Payments and Ticketing businesses and the retained business, which includes Cryptography Research Inc., which was part of the former RSD segment. The fair value of the retained business was estimated by management using a discounted cash flow model. The Company's cash flow projections for the retained business included significant judgments and assumptions relating to revenue growth rates, projected operating income and the discount rate.

The operating results of these businesses did not qualify for reporting as discontinued operations. The reported results and financial position of the businesses did not necessarily reflect the total value of the businesses that the Company realized upon their sale.

18. Restructuring and Other Charges

2020 Restructuring Plan

In November 2020, the Company initiated a restructuring program to reduce overall expenses which is expected to improve future profitability by reducing spending on research and development efforts and sales, general and administrative programs (the "2020 Restructuring Plan"). In connection with this restructuring program, the Company initiated a plan of termination resulting in a reduction of approximately 70 employees. During the years ended December 31, 2021 and 2020, the Company recorded charges of approximately $0.4 million and $3.3 million, respectively, related primarily to the reduction in workforce. The 2020 Restructuring Plan was completed in the second quarter of 2021.

2019 Restructuring Plan

In June 2019, the Company initiated a restructuring program to reduce overall expenses which is expected to improve future profitability by reducing spending on research and development efforts and sales, general and administrative programs (the "2019 Restructuring Plan"). In connection with this restructuring program, the Company initiated a plan of termination resulting in a reduction of approximately 80 employees. During the years ended December 31, 2020 and 2019, the Company recorded charges of approximately $0.8 million and $8.8 million, respectively, related to the reduction in workforce. The 2019 Restructuring Plan was substantially completed in the second quarter of 2020.

19. Income Taxes

Income (loss) before taxes consisted of the following:

	Years Ended December 31,		
(In thousands)	**2021**	**2020**	**2019**
Domestic	$ 19,244	$ (39,937)	$ (76,848)
Foreign	4,042	3,398	(5,700)
	$ 23,286	$ (36,539)	$ (82,548)

The provision for income taxes was comprised of:

	Years Ended December 31,		
(In thousands)	**2021**	**2020**	**2019**
Federal:			
Current	$ (112)	$ (446)	$ 2,932
Deferred	2,042	2,018	2,016
State:			
Current	214	657	670
Deferred	324	(1,589)	(1,198)
Foreign:			
Current	3,328	3,097	1,708
Deferred	(844)	195	(2,712)
	$ 4,952	$ 3,932	$ 3,416

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The differences between the Company's effective tax rate and the U.S. federal statutory regular tax rate were as follows:

	Years Ended December 31,		
	2021	2020	2019
U.S. federal statutory rate	21.0 %	21.0 %	21.0 %
State income tax (expense)/benefit	2.2	(2.5)	1.0
Withholding tax	4.4	(4.1)	(3.7)
Foreign rate differential	3.3	(4.8)	(1.1)
Research and development credit	(7.1)	(4.8)	1.2
Executive compensation	6.6	(1.8)	(1.2)
Stock-based compensation	(7.7)	0.6	(2.4)
Foreign tax credit	(84.0)	(89.5)	3.6
Foreign-derived intangible income deduction	(55.8)	13.7	5.0
Divestiture	—	(20.4)	5.1
Acquisition	8.8	—	—
Other	(0.2)	0.8	(0.4)
Valuation allowance	129.8	81.0	(32.2)
	21.3 %	(10.8)%	(4.1)%

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

	As of December 31,	
(In thousands)	**2021**	**2020**
Deferred tax assets:		
Depreciation and amortization	$ 6,578	$ 13,199
Lease liabilities	7,873	8,716
Other timing differences, accruals and reserves	5,828	5,347
Deferred equity compensation	5,077	4,631
Net operating loss carryovers	14,602	15,692
Capitalized research	22,301	—
Tax credits	130,348	168,978
Total gross deferred tax assets	192,607	216,563
Deferred tax liabilities:		
Lease right-of-use assets	(5,323)	(6,392)
Convertible debt	(81)	(130)
Deferred revenue	(267)	(45,845)
Total gross deferred tax liabilities	(5,671)	(52,367)
Total net deferred tax assets	186,936	164,196
Valuation allowance	(206,874)	(174,119)
Net deferred tax liabilities	$ (19,938)	$ (9,923)

	As of December 31,	
(In thousands)	**2021**	**2020**
Reported as:		
Non-current deferred tax assets	$ 4,047	$ 4,353
Non-current deferred tax liabilities	(23,985)	(14,276)
Net deferred tax liabilities	$ (19,938)	$ (9,923)

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. During 2020, as a result of the enactment of California A.B. 85 and the temporary suspension of California net operating loss utilization for tax years 2020 through 2022, the Company released $0.7 million of the valuation allowance on its deferred tax asset for California research and development tax credits. In 2021, based on available evidence, the Company recorded a full valuation allowance on its California deferred tax assets. The Company continues to maintain a full valuation allowance on its California and U.S. federal deferred tax assets as it does not expect to be able to fully utilize them.

The following table presents the tax valuation allowance information for the years ended December 31, 2021, 2020 and 2019:

(In thousands)	Balance at Beginning of Period	Charged (Credited) to Operations	Charged to Other Account*	Valuation Allowance Release	Balance at End of Period
Tax Valuation Allowance					
Year ended December 31, 2019	$ 173,878	22,220	—	—	$ 196,098
Year ended December 31, 2020	$ 196,098	(21,294)	3	(688)	$ 174,119
Year ended December 31, 2021	$ 174,119	32,544	211	—	$ 206,874

* Amounts not charged to operations are charged to other comprehensive income or retained earnings.

As of December 31, 2021, the Company had California and other state net operating loss carryforwards of $202.0 million and $12.6 million, respectively. As of December 31, 2021, the Company had federal research and development tax credit carryforwards of $41.7 million and foreign tax credits of $85.5 million. As of December 31, 2021, the Company had California research and development tax credit carryforwards of $24.2 million and California alternative minimum tax credit carryforwards of $0.3 million. The federal foreign tax credits and research and development credits begin to expire in 2022. Approximately $9.0 million of federal foreign tax credits would expire if not utilized in 2022. The California net operating losses begin to expire in 2024. 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, the Company's 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, 2021, the Company had $146.2 million of unrecognized tax benefits including $18.9 million recorded as a reduction of long-term deferred tax assets, $126.1 million recorded as a reduction of other assets associated with refundable withholding taxes previously withheld from licensees in South Korea, and $1.3 million recorded to long-term income taxes payable. As a result of recent court rulings in South Korea, the Company has determined that they may be entitled to refund claims for foreign taxes previously withheld from licensees in South Korea. The Company recognizes that there are numerous risks and uncertainties associated with the ultimate collection of this refund and has therefore established an offsetting reserve for the entire amount of potentially refundable withholding taxes previously withheld in South Korea. If recognized, $127.3 million would be recorded as an income tax benefit on the consolidated statement of operations. As of December 31, 2020, the Company had $134.0 million of unrecognized tax benefits including $23.6 million recorded as a reduction of long-term deferred tax assets, $109.0 million recorded as a reduction of other assets associated with refundable withholding taxes previously withheld from licensees in South Korea, and $1.9 million recorded to long term income taxes payable.

A reconciliation of the beginning and ending amounts of unrecognized income tax benefits for the years ended December 31, 2021, 2020 and 2019 was as follows:

	Years Ended December 31,		
(In thousands)	2021	2020	2019
Balance at January 1	$ 134,044	$ 115,653	$ 23,482
Tax positions related to current year:			
Additions	18,748	18,600	16,485
Tax positions related to prior years:			
Additions	615	—	76,158
Reductions	(1,586)	(209)	(472)
Settlements	(5,606)	—	—
Balance at December 31	$ 146,215	$ 134,044	$ 115,653

The Company recognizes interest and penalties related to uncertain tax positions as a component of the income tax provision (benefit). At December 31, 2021 and 2020, an immaterial amount of interest and penalties is included in long-term income taxes payable.

Rambus files income tax returns for the U.S., California, India and various other state and foreign jurisdictions. The U.S. federal returns are subject to examination from 2016 and forward. The California returns are subject to examination from 2017 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 Company settled its 2010, 2016 and 2018 audits with the California Franchise Tax Board in 2021, agreeing to the immaterial adjustments proposed. The India returns are under examination by the Indian tax administration for tax years beginning with 2011, except for 2012 through 2014 which were assessed in the Company's favor, and are subject to examination from 2015 and forward. 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. The estimated potential reduction in the Company's unrecognized tax benefits in the next 12 months would not be material.

At December 31, 2021, no other income taxes (state or foreign) have been provided on undistributed earnings of approximately $25.4 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 $2.2 million of foreign withholding taxes and an immaterial amount of U.S. taxes.

20. 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.

21. Acquisitions

2021 Acquisitions

AnalogX Inc.

On July 2, 2021 (the "AnalogX Closing Date"), the Company completed its acquisition of AnalogX, a premier interconnect IP company, by acquiring all of its outstanding shares. The Company acquired AnalogX for total consideration of approximately $47.5 million, including certain adjustments for working capital, which consisted of $40.4 million in initial cash consideration at the AnalogX Closing Date and additional deferred payments totaling approximately $7.4 million, initially recorded at its present value of approximately $7.1 million, (the “Deferred Payments”). The Deferred Payments will be paid in cash over three years following the AnalogX Closing Date, in three installments on each of the dates that are 12 months, 24 months and 36 months following the AnalogX Closing Date. A portion of the purchase price, $5.9 million of the consideration, was deposited into an escrow account to fund indemnification obligations and other contractual provisions, to be released 12 months after the AnalogX Closing Date. The addition of the technology and expertise from AnalogX augments the Company’s SerDes offerings and CXL memory interconnect initiative.

As part of the acquisition, the Company agreed to pay certain AnalogX employees $3.5 million in cash over three years following the AnalogX Closing Date (the “AnalogX Retention Bonus”), to be paid in three equal installments on each of the dates that are 12 months, 24 months and 36 months following the AnalogX Closing Date. The AnalogX Retention Bonus payouts are subject to the condition of continued employment. Therefore, the AnalogX Retention Bonus payouts will be treated as compensation and will be expensed ratably over the retention period.

As of December 31, 2021, the Company had incurred approximately $0.8 million in external acquisition costs in connection with the transaction, which were expensed as incurred.

The purchase price allocation and related accounting for this acquisition is preliminary. The preliminary fair value estimates for the assets acquired and liabilities assumed were based upon preliminary calculations and valuations and the Company’s estimates and assumptions for the acquisition are subject to change if the Company obtains additional information during the measurement period.

The fair value of the intangible assets acquired was determined by management primarily by using the estimated current replacement cost under the cost approach. The fair values of the remaining assets acquired and liabilities assumed approximated their carrying values at the AnalogX Closing Date. The Company performed a valuation of the net assets acquired as of the AnalogX Closing Date.

The total consideration from the acquisition was preliminarily allocated as follows:

(In thousands)	**Total**
Cash and cash equivalents	$ 2,763
Accounts receivable	280
Unbilled receivables	1,566
Prepaid expenses and other current assets	1,354
Identified intangible assets	6,800
IPR&D	3,800
Goodwill	38,326
Property, plant and equipment, net	118
Accounts payable	(1,112)
Deferred revenue	(23)
Income taxes payable	(6,144)
Other current liabilities	(215)
Total	$ 47,513

The goodwill arising from the acquisition is primarily attributed to synergies related to the combination of new and complementary technologies of the Company and the assembled workforce of the acquired business. Approximately $26.9 million of the goodwill is expected to be deductible for tax purposes.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The identified intangible assets assumed in the acquisition of AnalogX were recognized as follows based upon their estimated fair values as of the acquisition date:

	Total	Estimated Weighted-Average Useful Life
	(in thousands)	(in years)
Existing technology	$ 6,300	5 years
Customer contracts and contractual relationships	500	2 years
IPR&D	3,800	Not applicable
Total	$ 10,600	

IPR&D consists of multiple projects relating to the development of various high-speed SerDes technologies. The projects are expected to be completed within the next three years. The acquired IPR&D will not be amortized until completion of the related products, which is determined by when the underlying project reaches technological feasibility and commences commercial production. Upon completion, the IPR&D projects will be amortized over their useful lives, which are expected to range between three years and five years.

PLDA Group

On June 16, 2021, the Company announced that it had entered into an agreement to acquire PLDA, a provider of high-speed interconnect solutions. On August 18, 2021 (the “PLDA Closing Date”), the Company completed its acquisition of PLDA by acquiring all of its outstanding shares. Under the terms of the Share Purchase Agreement, the total consideration of approximately $85.6 million is comprised of $67.1 million in closing cash consideration, 0.3 million shares of the Company’s common stock (valued based on the Company’s closing stock price at the PLDA Closing Date, which amounted to approximately $6.9 million) and up to an additional $21.0 million to be paid in shares of common stock, currently valued at $16.9 million (the “fair value of the earn-out liability”), subject to certain revenue targets of the acquired business for the next three years. The fair value of the earn-out liability will be remeasured each quarter, depending on the acquired business’s revenue performance relative to target over the applicable period. The Company has classified its liability for the contingent earn-out consideration related to the PLDA acquisition within Level 3 of the fair value hierarchy because the fair value is determined using significant unobservable inputs. A portion of the purchase price, $10.0 million of the consideration, was deposited into an escrow account to fund indemnification obligations and other contractual provisions, to be released 24 months after the PLDA Closing Date. The addition of the technology and expertise from PLDA augments the Company’s digital controller IP and CXL memory interconnect initiative.

As part of the acquisition, the Company agreed to pay certain PLDA employees $3.0 million in cash over three years following the PLDA Closing Date (the “PLDA Retention Bonus”), to be paid in three equal installments on each of the dates that are 12 months, 24 months and 36 months following the PLDA Closing Date. The PLDA Retention Bonus payouts are subject to the condition of continued employment. Therefore, the PLDA Retention Bonus payouts will be treated as compensation and will be expensed ratably over the retention period.

As of December 31, 2021, the Company had incurred approximately $1.4 million in external acquisition costs in connection with the transaction, which were expensed as incurred.

The purchase price allocation and related accounting for this acquisition is preliminary. The preliminary fair value estimates for the assets acquired and liabilities assumed were based upon preliminary calculations and valuations and the Company’s estimates and assumptions for the acquisition are subject to change if the Company obtains additional information during the measurement period.

The fair value of the intangible assets acquired was determined by management primarily by using the multi-period excess earnings method under the income approach. This method reflects the present value of the projected cash flows that are expected to be generated by the existing technologies less charges representing the contribution of other assets to those cash flows. The fair values of the remaining assets acquired and liabilities assumed approximated their carrying values at the PLDA Closing Date. The Company performed a valuation of the net assets acquired as of the PLDA Closing Date.

The total consideration from the acquisition was preliminarily allocated as follows:

(In thousands)	Total
Cash and cash equivalents	$ 5,820
Accounts receivable	2,233
Inventories	125
Prepaid expenses and other current assets	836
Identified intangible assets	21,400
IPR&D	7,400
Goodwill	57,543
Property, plant and equipment, net	679
Operating lease right-of-use asset	864
Other assets	339
Accounts payable	(1,046)
Accrued salaries and benefits	(814)
Deferred revenue	(514)
Income taxes payable	(118)
Operating lease liability	(852)
Deferred tax liability	(8,180)
Other current liabilities	(74)
Total	$ 85,641

The goodwill arising from the acquisition is primarily attributed to synergies related to the combination of new and complementary technologies of the Company and the assembled workforce of the acquired business. This goodwill is not expected to be deductible for tax purposes.

The identified intangible assets assumed in the acquisition of PLDA were recognized as follows based upon their estimated fair values as of the acquisition date:

	Total (in thousands)	Estimated Weighted-Average Useful Life (in years)
Existing technology	$ 20,400	3 to 5 years
Customer contracts and contractual relationships	1,000	2 years
IPR&D	7,400	Not applicable
Total	$ 28,800	

IPR&D consists of multiple projects relating to the development of PLDA's PCIe Gen 6 and CXL 3.0 technologies. The projects are expected to be completed within the next 12 months. The acquired IPR&D will not be amortized until completion of the related products which are determined by when the underlying project reaches technological feasibility and commences commercial production. Upon completion, the IPR&D projects will be amortized over their respective useful life, which are expected to range between three years and five years.

Unaudited Pro Forma Combined Consolidated Financial Information

The following pro forma financial information presents the combined results of operations for the Company and AnalogX and PLDA as if the acquisitions had occurred on January 1, 2020. The pro forma financial information has been prepared for comparative purposes only and does not purport to be indicative of the actual operating results that would have been recorded had the acquisitions actually taken place on January 1, 2020, and should not be taken as indicative of future consolidated operating results. Additionally, the pro forma financial results do not include any anticipated synergies or other expected benefits from the acquisitions (in thousands, except per share amounts):

	For the Years Ended December 31,	
	2021	2020
Total revenue	$ 338,961	$ 267,006
Net income (loss)	$ 16,533	$ (33,871)

The pro forma net income for 2021 was adjusted to exclude $2.2 million of acquisition-related costs incurred in 2021. Consequently, the pro forma net loss for 2020 was adjusted to include these costs.

2019 Acquisitions

Northwest Logic, Inc.

On July 26, 2019, the Company entered into an Agreement and Plan of Merger (the "Merger Agreement") with Northwest Logic, a leading supplier of memory, PCIe, and MIPI digital controllers. On August 23, 2019 (the "Closing Date"), the Company completed its acquisition of Northwest Logic by acquiring all issued and outstanding shares of Northwest Logic through the merger of a wholly-owned Rambus subsidiary with Northwest Logic. Under the terms of the Merger Agreement, the Company paid approximately $21.9 million in cash, including certain bonus payments and adjustments for working capital. Of the purchase price, $3.0 million of the consideration was deposited into an escrow account to fund indemnification obligations and other contractual provisions, to be released 24 months after the Closing Date. This acquisition allows the Company to further scale, bringing together high-speed design expertise with the physical and digital IP families from renowned market leaders to offer comprehensive memory and SerDes IP solutions for chip designers. The Company integrated Northwest Logic's offerings and design team into its IP cores technology solutions.

As part of the acquisition, the Company agreed to pay $9.0 million to certain Northwest Logic employees in cash over three years following August 23, 2019 (the "Retention Bonus"), to be paid in three installments of $3.0 million on each of the dates that are 12 months, 24 months and 36 months following the Closing Date. The Retention Bonus payouts are subject to the condition of continued employment, and therefore treated as compensation and expensed as incurred.

As of December 31, 2019, the Company had incurred approximately $0.7 million in external acquisition costs in connection with the transaction, which were expensed as incurred.

The fair value of the assets acquired was determined by management primarily by using the multi-period excess earnings method under the income approach. This method reflects the present value of the projected cash flows that are expected to be generated by the existing technologies less charges representing the contribution of other assets to those cash flows. The Company performed a valuation of the net assets acquired as of the Closing Date.

The total consideration from the business combination was allocated as of the Closing Date, and reflects adjustments made through the measurement period to finalize the purchase price accounting, as follows:

(In thousands)	Total
Cash and cash equivalents	$ 159
Accounts receivable	1,679
Prepaid expenses and other current assets	65
Identified intangible assets	8,800
Goodwill	13,477
Operating lease right-of-use asset	178
Other asset	9
Accounts payable	(9)
Operating lease liability	(178)
Other current liabilities	(108)
Deferred tax liability, net	(2,133)
Total	$ 21,939

The goodwill arising from the acquisition is primarily attributed to synergies related to the combination of new and complementary technologies of the Company and the assembled workforce of Northwest Logic. This goodwill is not deductible for tax purposes.

The identified intangible assets assumed in the acquisition of Northwest Logic were recognized as follows based upon their estimated fair values as of the acquisition date:

	Total		Estimated Weighted-Average Useful Life
	(in thousands)		(in years)
Existing technology	$	8,100	5
Customer contracts and contractual relationships		400	2
Customer backlog		300	0.5
Total	$	8,800	

Secure Silicon IP and Protocols Business from Verimatrix

On September 11, 2019, the Company announced it had signed an asset purchase agreement to acquire the Secure Silicon IP and Protocols business from Verimatrix, formerly Inside Secure, for $65.0 million in cash. On December 8, 2019 (the “Closing Date”), the Company completed its acquisition of the Secure Silicon IP and Protocols business. Under the terms of the Asset Purchase Agreement, as amended, the Company paid approximately $45.0 million in cash at the Closing Date, and may have been required to pay up to an additional $20.0 million, at that time valued at $1.8 million (the “fair value of the earn-out liability”), subject to certain revenue targets of the transferred business for the calendar year 2020. Since the specified targets were not met for calendar year 2020, the Company recorded a full reduction in the fair value of the earn-out liability, which resulted in a gain on the consolidated statements of operations. The addition of the embedded security teams, products and expertise from the Secure Silicon IP and Protocols business augments the Company’s portfolio of mission-critical embedded security products and expands its offerings for data center, AI, networking and automotive.

The total adjusted purchase consideration for the acquisition of the Secure Silicon IP and Protocols business was $46.8 million, which consisted of the following:

(In thousands)		Total
Cash consideration transferred at the Closing Date	$	45,000
Fair value of earn-out liability		1,800
Total adjusted purchase price	$	46,800

As part of the acquisition, the Company agreed to pay $1.0 million to certain employees in cash over two years effective January 1, 2020 (the “Retention Bonus”), to be paid in arrears in the fourth quarter of 2020 and 2021, respectively. The Retention Bonus payouts are subject to the condition of continued employment, and therefore treated as compensation and expensed as incurred.

As of December 31, 2019, the Company had incurred approximately $3.1 million in external acquisition costs in connection with the transaction, which were expensed as incurred.

The fair value of the assets acquired was determined by management primarily by using the multi-period excess earnings method under the income approach. This method reflects the present value of the projected cash flows that are expected to be generated by the existing technologies less charges representing the contribution of other assets to those cash flows. The Company performed a valuation of the net assets acquired as of the Closing Date.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The Company performed a valuation of the net assets acquired as of the Closing Date. The total consideration from the acquisition was allocated as follows:

(In thousands)	Total
Prepaid expenses and other current assets	$ 267
Unbilled receivables	6,765
Operating lease right-of-use assets	852
Identified intangible assets	23,500
Goodwill	16,845
Deferred revenue	(310)
Operating lease liabilities	(852)
Other current liabilities	(267)
Total	$ 46,800

The goodwill arising from the acquisition is primarily attributed to synergies related to the combination of new and complementary technologies of the Company and the assembled workforce of the Secure Silicon IP and Protocols business. Approximately $15.0 million of the goodwill is deductible for tax purposes.

The identified intangible assets assumed in the acquisition of the Secure Silicon IP and Protocols business were recognized as follows based upon their estimated fair values as of the acquisition date:

	Total	Estimated Weighted-Average Useful Life
	(in thousands)	(in years)
Existing technology	$ 21,600	3 to 5 years
Customer contracts and contractual relationships	900	5 years
IPR&D	1,000	Not applicable
Total	$ 23,500	

IPR&D consisted of one project, primarily relating to the development of Media Access Control Security frame engines, which was part of the Silicon IP solutions. During the year ended December 31, 2020, the project was completed and the asset is being amortized over its useful life of five years. During the year ended December 31, 2020, the amortization for the completed project was not material.

Additionally, the revenue recognized from the Northwest Logic and Secure Silicon IP and Protocols business acquisitions was not material to the Company’s consolidated financial statements during the year ended December 31, 2019, either individually or in the aggregate. Furthermore, the Company does not track operating results from these businesses separately.

INDEX TO EXHIBITS

Exhibit Number	Description of Document
3.1	Amended and Restated Certificate of Incorporation of Registrant filed May 29, 1997.
3.2	Certificate of Amendment of Amended and Restated Certificate of Incorporation of Registrant filed June 14, 2000.
3.3(1)	Amended and Restated Bylaws of Registrant dated April 25, 2013.
4.1(2)	Form of Registrant's Common Stock Certificate.
4.2(3)	Indenture, dated November 17, 2017, between Rambus Inc and U.S. Bank National Association (including form of 1.375% Convertible Senior Note due 2023).
4.3	Description of Securities.
10.1(4)	Form of Indemnification Agreement entered into by Registrant with each of its directors and executive officers.
10.2(5)*	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.
10.3(6)*	2006 Equity Incentive Plan, as amended.
10.4(6)*	Forms of agreements under the 2006 Equity Incentive Plan, as amended.
10.5(7)*	2015 Equity Incentive Plan, as amended.
10.6(8)*	Form of Restricted Stock Unit Agreement (2015 Equity Incentive Plan).
10.7(8)*	Form of Stock Option Agreement (2015 Equity Incentive Plan).
10.8(7)*	2015 Employee Stock Purchase Plan, as amended.
10.9(9)+	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.
10.10(9)+	Semiconductor Patent License Agreement, dated January 19, 2010, between Registrant and Samsung Electronics Co., Ltd.
10.11(10)	First Amendment of Lease, dated November 4, 2011, by and between Registrant and MT SPE, LLC.
10.12(11)	Employment Agreement between the Company and Luc Seraphin, dated as of October 25, 2018.
10.13(11)	Amended and Restated Change of Control Severance Agreement between the Company and Luc Seraphin, dated as of October 25, 2018.
10.14(12)+	Settlement Agreement, dated June 11, 2013, among Registrant, SK hynix and certain SK hynix affiliates.
10.15(13)+	Semiconductor Patent License Agreement, dated June 11, 2013, between Registrant and SK hynix.
10.16(14)+	Settlement Agreement, dated December 9, 2013, between Rambus Inc., Micron Technology, Inc., and certain Micron affiliates.
10.17(14)+	Semiconductor Patent License Agreement, dated December 9, 2013, between Rambus, Inc. and Micron Technology, Inc.
10.18(14)**	Amendment to Semiconductor Patent License Agreement, dated December 30, 2013, by and between Rambus Inc. and Samsung Electronics Co., Ltd.
10.19(15)**	Amendment 1 to Semiconductor Patent License Agreement, dated June 17, 2015, by and between Rambus Inc. and SK hynix Inc.
10.20(16)	Asset Purchase Agreement, dated June 29, 2016, by and between Rambus Inc., Bell ID Singapore Ptd Ltd, Inphi Corporation and Inphi International Pte. Ltd.
10.21(17)	Offer Letter, dated September 9, 2016, by and between Rambus Inc. and Rahul Mathur.
10.22(3)	Form of Convertible Note Hedge Confirmation.
10.23(3)	Form of Warrant Confirmation.
10.24(18)	Lease agreement between Rambus Inc. and 237 North First Street Holdings, LLC dated July 8, 2019.
10.25(19)	Offer Letter, dated August 9, 2019, by and between Rambus Inc. and Sean Fan.
10.26(19)	2019 Inducement Equity Incentive Plan.
10.27(19)	Form of Restricted Stock Unit Agreement (2019 Inducement Equity Incentive Plan).
10.28(19)	Form of Performance Based Restricted Stock Unit Agreement (2019 Inducement Equity Incentive Plan).
10.29(20)	First Amendment to Net Lease Agreement dated April 22, 2020 relating to the New San Jose Headquarters Location between Rambus Inc. and 237 North First Street Holdings, LLC.
10.30(21)+	Amendment No. 1 to Semiconductor Patent License Agreement, dated September 2, 2020, between Rambus, Inc. and Micron Technology, Inc.

Exhibit Number	Description of Document
10.31(22)	Master Confirmation between Deutsche Bank AG, London Branch as counterparty, through its agent Deutsche Bank Securities Inc. ("Deutsche Bank") and Rambus Inc., dated November 11, 2020.
10.32(23)+	Amendment No. 2 dated December 15, 2020, to the Semiconductor Patent License Agreement between Rambus Inc. and Micron Technology, Inc.
10.33(24)	Letter agreement dated as of March 12, 2021, among Rambus Inc. and Barington Companies Equity Partners, L.P. and certain other parties.
10.33(25)	Master Confirmation between Deutsche Bank AG, London Branch, through its agent Deutsche Bank Securities Inc. ("Dealer") and Rambus Inc., dated June 15, 2021.
10.34(26)	Employment Agreement for Vice President, Finance and Interim Chief Financial Officer between the Company and Keith Jones, dated as of October 12, 2021.
21.1	Subsidiaries of Registrant.
23.1	Consent of Independent Registered Public Accounting Firm.
24.1^	Power of Attorney.
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 - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL 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
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101)

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^ Previously submitted.

* 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.

+ Portions of this exhibit have been redacted in compliance with Regulation S-K Item 601(b)(10).

† The certifications furnished in Exhibit 32.1 and 32.2 hereto are deemed to accompany this Annual Report on Form 10-K and will not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended. Such certifications will not be deemed to be incorporated by reference into any filings under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, except to the extent that the registrant specifically incorporates it by reference.

(1) Incorporated by reference to the Form 8-K filed on April 30, 2013.

(2) Incorporated by reference to the Form S-1/A (file no. 333-22885) filed on April 24, 1997.

(3) Incorporated by reference to the Form 8-K filed on November 17, 2017.

(4) Incorporated by reference to the Form 10-Q filed on May 7, 2021.

(5) Incorporated by reference to the Form 8-K filed on March 9, 2015.

(6) Incorporated by reference to the Form 8-K filed on April 30, 2014.

(7) Incorporated by reference to the Form 8-K filed on May 6, 2020.

(8) Incorporated by reference to the Form 10-Q filed on July 23, 2015.

(9)	Incorporated by reference to the Form 10-Q filed on May 3, 2010.
(10)	Incorporated by reference to the Form 10-K filed on February 24, 2012.
(11)	Incorporated by reference to the Form 8-K filed on October 29, 2018.
(12)	Incorporated by reference to the Form 10-Q/A filed on January 13, 2014.
(13)	Incorporated by reference to the Form 10-Q filed on July 29, 2013.
(14)	Incorporated by reference to the Form 10-K filed on February 21, 2014.
(15)	Incorporated by reference to the Form 10-Q filed on July 23, 2015.
(16)	Incorporated by reference to the Form 10-Q filed on July 22, 2016.
(17)	Incorporated by reference to the Form 8-K filed on September 21, 2016.
(18)	Incorporated by reference to the Form 10-Q filed on August 2, 2019.
(19)	Incorporated by reference to the Form 8-K filed on August 28, 2019.
(20)	Incorporated by reference to the Form 10-Q filed on August 7, 2020.
(21)	Incorporated by reference to the Form 10-Q filed on November 6, 2020.
(22)	Incorporated by reference to the Form 8-K dated November 12, 2020.
(23)	Incorporated by reference to the Form 10-K filed on February 26, 2021.
(24)	Incorporated by reference to the Form 8-K filed on March 16, 2021.
(25)	Incorporated by reference to the Form 8-K filed on June 16, 2021.
(26)	Incorporated by reference to the Form 8-K filed on October 13, 2021.

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/ Luc Seraphin

Luc Seraphin

Chief Executive Officer and President

(Principal Executive Officer)

Date: February 28, 2022

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Luc Seraphin, Keith Jones and John Shinn 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.

Signature	Title	Date
/s/ LUC SERAPHIN Luc Seraphin	Chief Executive Officer, President and Director (Principal Executive Officer)	February 28, 2022
/s/ KEITH JONES Keith Jones	Vice President, Finance and Interim Chief Financial Officer (Principal Financial and Accounting Officer)	February 28, 2022
/s/ CHARLES KISSNER Charles Kissner	Chairman of the Board of Directors	February 28, 2022
/s/ EMIKO HIGASHI Emiko Higashi	Director	February 28, 2022
/s/ JAMES MITAROTONDA James Mitarotonda	Director	February 28, 2022
/s/ MEERA RAO Meera Rao	Director	February 28, 2022
/s/ KAREN ROGGE Karen Rogge	Director	February 28, 2022
/s/ SANJAY SARAF Sanjay Saraf	Director	February 28, 2022
/s/ NECIP SAYINER Necip Sayiner	Director	February 28, 2022
/s/ ERIC STANG Eric Stang	Director	February 28, 2022

Exhibit 3.1

AMENDED AND RESTATED CERTIFICATE OF INCORPORATION

OF

RAMBUS INC.

Rambus Inc., a corporation organized and existing under the laws of the State of Delaware, hereby certifies as follows:

A. The name of the Corporation is Rambus Inc. The Corporation was originally incorporated under the same name and the original Certificate of Incorporation of the Corporation was filed with the Delaware Secretary of State on February 3, 1997. The Amended and Restated Certificate of Incorporation of the Corporation was filed with the Delaware Secretary of State on April 7, 1997. The Certificate of Designation of Rights, Preferences and Privileges of Series E Participating Preferred Stock of the Corporation was filed with the Delaware Secretary of State on April 17, 1997.

B. Pursuant to Sections 242 and 245 of the General Corporation Law of the State of Delaware, this Amended and Restated Certificate of Incorporation restates and amends the provisions of the Amended and Restated Certificate of Incorporation and the Certificate of Designation of Rights, Preferences and Privileges of Series E Participating Preferred Stock of this Corporation.

C. The text of the Certificate of Incorporation is hereby amended and restated in its entirety to read as follows:

I. The name of the corporation (the "***Corporation***") is:

Rambus Inc.

II. The address of the Corporation's registered office in the State of Delaware is 1209 Orange Street, Wilmington, Delaware 19801, County of New Castle. The name of its registered agent at such address is The Corporation Trust Company.

III. The nature of the business or purposes to be conducted or promoted by the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of Delaware.

IV. This Corporation is authorized to issue two classes of stock to be designated, respectively, Common Stock and Preferred Stock. The total number of shares of Common Stock this Corporation is authorized to issue is 60,000,000, $0.001 par value, and the total number of shares of Preferred Stock this Corporation is authorized to issue is 5,000,000, $0.001 par value. Of the Preferred Stock, 40,000 shares shall be designated Series E Participating Preferred Stock ("Series E Preferred"), and 4,960,000 shares shall be undesignated.

The Preferred Stock may be issued from time to time in one or more series pursuant to a resolution or resolutions providing for such issue duly adopted by the Board of Directors (authority to do so being hereby expressly vested in the Board). The Board of Directors is further authorized to determine or alter the rights, preferences, privileges and restrictions granted to or imposed upon any wholly unissued series of Preferred Stock and to fix the number of shares of any series of Preferred Stock and the designation of any such series of Preferred Stock. The Board of Directors, within the limits and restrictions stated in any resolution or resolutions of the Board of Directors originally fixing the number of shares constituting any series, may increase or decrease (but not below the number of shares in any such series then outstanding) the number of shares of any series subsequent to the issue of shares of that series.

The Corporation shall from time to time in accordance with the laws of the State of Delaware increase the authorized amount of its Common Stock if at any time the number of shares of Common Stock remaining unissued and available for issuance shall not be sufficient to permit conversion of the Preferred Stock.

The relative rights, preferences, privileges and restrictions granted to or imposed on the Series E Preferred or the holders thereof are as follows:

1. Proportional Adjustment. In the event the Corporation shall at any time after the issuance of any share or shares of Series E Participating Preferred Stock (i) declare any dividend on Common Stock of the Corporation ("***Common*. *Stock***") payable in shares of Common Stock, (ii) subdivide the outstanding Common Stock or (iii) combine the outstanding Common Stock into a smaller number of shares, then in each such case the Corporation shall simultaneously effect a proportional adjustment to the number of outstanding shares of Series E Participating Preferred Stock.

2. Dividends and Distributions.

(a) Subject to the prior and superior right of the holders of any shares of any series of Preferred Stock ranking prior and superior to the shares of Series E Participating Preferred Stock with respect to dividends, the holders of shares of Series E Participating Preferred Stock shall be entitled to receive when, as and if declared by the Board of Directors out of funds legally available for the purpose, quarterly dividends payable in cash on the last day of January, April, July and October in each year (each such date being referred to herein as a "***Quarterly Dividend Payment Date***"), commencing on the first Quarterly Dividend Payment Date after the first issuance of a share or fraction of a share of Series E Participating Preferred Stock, in an amount per share (rounded to the nearest cent) equal to 1,000 times the aggregate per share amount of all cash dividends, and 1,000 times the aggregate per share amount (payable in kind) of all non-cash dividends or other distributions other than a dividend payable in shares of Common Stock or a subdivision of the outstanding shares of Common Stock (by reclassification or otherwise), declared on the Common Stock since the immediately preceding Quarterly Dividend Payment Date, or, with respect to the first Quarterly Dividend Payment Date, since the first issuance of any share or fraction of a share of Series E Participating Preferred Stock.

(b) The Corporation shall declare a dividend or distribution on the Series E Participating Preferred Stock as provided in paragraph (a) above immediately after it declares a dividend or distribution on the Common Stock (other than a dividend payable in shares of Common Stock).

(c) Dividends shall begin to accrue on outstanding shares of Series E Participating Preferred Stock from the Quarterly Dividend Payment Date next preceding the date of issue of such shares of Series E Participating Preferred Stock, unless the date of issue of such shares is prior to the record date for the first Quarterly Dividend Payment Date, in which case dividends on such shares shall begin to accrue from the date of issue of such shares, or unless the date of issue is a Quarterly Dividend Payment Date or is a date after the record date for the determination of holders of shares of Series E Participating Preferred Stock entitled to receive a quarterly dividend and before such Quarterly Dividend Payment Date, in either of which events such dividends shall begin to accrue from such Quarterly Dividend Payment Date. Accrued but unpaid dividends shall not bear interest. Dividends paid on the shares of Series E Participating Preferred Stock in an amount less than the total amount of such dividends at the time accrued and payable on such shares shall be allocated pro rata on a share-by-share basis among all such shares at the time outstanding. The Board of Directors may fix a record date for the determination of holders of shares of Series E Participating Preferred Stock entitled to receive payment of a dividend or distribution declared thereon, which record date shall be no more than 30 days prior to the date fixed for the payment thereof.

3. Voting Rights. The holders of shares of Series E Participating Preferred Stock shall have the following voting rights:

(a) Each share of Series E Participating Preferred Stock shall entitle the holder thereof to 1,000 votes on all matters submitted to a vote of the stockholders of the Corporation.

(b) Except as otherwise provided herein or by law, the holders of shares of Series E Participating Preferred Stock and the holders of shares of Common Stock shall vote together as one class on all matters submitted to a vote of stockholders of the Corporation.

(c) Except as required by law, holders of Series E Participating Preferred Stock shall have no special voting rights and their consent shall not be required (except to the extent they are entitled to vote with holders of Common Stock as set forth herein) for taking any corporate action.

4. Certain Restrictions.

(a) The Corporation shall not declare any dividend on, make any distribution on, or redeem or purchase or otherwise acquire for consideration any shares of Common Stock after the first issuance of a share or fraction of a share of Series E Participating Preferred Stock unless concurrently therewith it shall declare a dividend on the Series E Participating Preferred Stock as required by Section 3 hereof.

(b) Whenever quarterly dividends or other dividends or distributions payable on the Series E Participating Preferred Stock as provided in Section 3 are in arrears, thereafter and until all accrued and unpaid dividends and distributions, whether or not declared, on shares of Series E Participating Preferred Stock outstanding shall have been paid in full, the Corporation shall not

(i) declare or pay dividends on, make any other distributions on, or redeem or purchase or otherwise acquire for consideration any shares of stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series E Participating Preferred Stock;

(ii) declare or pay dividends on, make any other distributions on any shares of stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with Series E Participating Preferred Stock, except dividends paid ratably on the Series E Participating Preferred Stock and all such parity stock on which dividends are payable or in arrears in proportion to the total amounts to which the holders of all such shares are then entitled;

(iii) redeem or purchase or otherwise acquire for consideration shares of any stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series E Participating Preferred Stock, provided that the Corporation may at any time redeem, purchase or otherwise acquire shares of any such parity stock in exchange for shares of any stock of the Corporation ranking junior (either as to dividends or upon dissolution, liquidation or winding up) to the Series E Participating Preferred Stock;

(iv) purchase or otherwise acquire for consideration any shares of Series E Participating Preferred Stock, or any shares of stock ranking on a parity with the Series E Participating Preferred Stock, except in accordance with a purchase offer made in writing or by publication (as determined by the Board of Directors) to all holders of such shares upon such terms as the Board of Directors, after consideration of the respective annual dividend rates and other relative rights and preferences of the respective series and classes, shall determine in good faith will result in fair and equitable treatment among the respective series or classes.

(c) The Corporation shall not permit any subsidiary of the Corporation to purchase or otherwise acquire for consideration any shares of stock of the Corporation unless the Corporation could, under paragraph (a) of this Section 5, purchase or otherwise acquire such shares at such time and in such manner.

5. Reacquired Shares. Any shares of Series E Participating Preferred Stock purchased or otherwise acquired by the Corporation in any manner whatsoever shall be retired and canceled promptly after the acquisition thereof. All such shares shall upon their cancellation become authorized but unissued shares of Preferred Stock and may be reissued as part of a new series of Preferred Stock to be created by resolution or resolutions of the Board of Directors, subject to the conditions and restrictions on issuance set forth herein and, in the Restated Certificate of Incorporation, as then amended.

6. Liquidation, Dissolution or Winding Up. Upon any liquidation, dissolution or winding up of the Corporation, the holders of shares of Series E Participating Preferred Stock shall be entitled to receive an aggregate amount per share equal to 1000 times the aggregate amount to be distributed per share to holders of shares of Common Stock plus an amount equal to any accrued and unpaid dividends on such shares of Series E Participating Preferred Stock.

7. Consolidation, Merger, etc. In case the Corporation shall enter into any consolidation, merger, combination or other transaction in which the shares of Common Stock are exchanged for or changed into other stock or securities, cash and/or any other property, then in any such case the shares of Series E Participating Preferred Stock shall at the same time be similarly exchanged or changed in an amount per share equal to 1,000 times the aggregate amount of stock, securities, cash and/or any other property (payable in kind), as the case may be, into which or for which each share of Common Stock is changed or exchanged.

8. No Redemption. The shares of Series E Participating Preferred Stock shall not be redeemable.

9. Ranking. The Series E Participating Preferred Stock shall rank junior to all other series of the Corporation's Preferred Stock as to the payment of dividends and the distribution of assets, unless the terms of any such series shall provide otherwise.

10. Amendment. The Restated Certificate of Incorporation of the Corporation shall not be further amended in any manner which would materially alter or change the powers, preference or special rights of the Series E Participating Preferred Stock so as to affect them adversely without the affirmative vote of the holders of a majority of the outstanding shares of Series E Participating Preferred Stock, voting separately as a class.

11. Fractional Shares. Series E Participating Preferred Stock may be issued in fractions of a share which shall entitle the holder, in proportion to such holder's fractional shares, to exercise voting rights, receive dividends, participate in distributions and to have the benefit of all other rights of holders of Series E Participating Preferred Stock.

V. The Corporation is to have perpetual existence.

VI. Elections of directors need not be by written ballot unless a stockholder demands election by written ballot at the meeting and before voting begins or unless the Bylaws of the Corporation shall so provide.

VII. The number of directors which constitute the whole Board of Directors of the Corporation shall be designated in the Bylaws of the Corporation. The Directors shall be divided into two classes with the term of office of the first class (Class I) to expire at the annual meeting of stockholders in 1998; the term of office of the second class (Class II) to expire at the annual meeting of stockholders held in 1999; and thereafter for each such term to expire at each second succeeding annual meeting of stockholders after such election.

VIII. In furtherance and not in limitation of the powers conferred by statute, the Board of Directors is expressly authorized to make, alter, amend or repeal the Bylaws of the Corporation.

IX. A. To the fullest extent permitted by the Delaware General Corporation Law as the same exists or as may hereafter be amended, a director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach fiduciary duty as a director.

B. The Corporation shall indemnify to the fullest extent permitted by law any person made or threatened to be made a party to an action or proceeding, whether criminal, civil, administrative or investigative, by reason of the fact that he, his testator or interstate is or was a director, officer or employee of the Corporation or any predecessor of the Corporation or serves or served at any other enterprise as a director, officer or employee at the request of the Corporation or any predecessor to the Corporation.

C. Neither any amendment nor repeal of this Article IX, nor the adoption of any provision of this Corporation's Certificate of Incorporation inconsistent with this Article IX, shall eliminate or reduce the effect of this Article IX, in respect of any matter occurring, or any action or proceeding accruing or arising or that, but for this Article IX, would accrue or arise, prior to such amendment, repeal or adoption of an inconsistent provision.

X. Following the effectiveness of the registration of any class of securities of the Corporation pursuant to the requirements of the Securities Exchange Act of 1934, as amended, no action shall be taken by the stockholders of the Corporation except at an annual or special meeting of the stockholders called in accordance with the Bylaws and no action shall be taken by the stockholders by written consent. The affirmative vote of sixty-six and two-thirds percent (66 2/3%) of the then issued and outstanding voting securities of the Corporation, voting together as a single class, shall be required for the amendment, repeal or modification of the provisions of Article VII or Article X of this Restated Certificate of Incorporation or Sections 2.3 (Special Meeting), 2.11 (Stockholder Action by Written Consent without a Meeting) or 2.15 (Advance Notice of Stockholder Nominees and Stockholder Business) of the Corporation's Bylaws.

XI. Meetings of stockholders may be held within or without the State of Delaware, as the Bylaws of the Corporation may provide. The books of the Corporation may by kept (subject to any provision contained in the statutes) outside of the State of Delaware at such place or places may be designated from time to time by the Board of Directors or in the Bylaws of the Corporation.

IN WITNESS WHEREOF, the Corporation has caused this certificate to be signed by Gary Harmon, its Secretary, this 28th day of May, 1997.

/s/ Gary Harmon

Gary Harmon, Secretary

Exhibit 3.2

CERTIFICATE OF AMENDMENT OF

AMENDED AND RESTATED CERTIFICATE OF INCORPORATION

OF

RAMBUS INC.

It is hereby certified that:

1. The name of the corporation (hereinafter called the "Corporation") is Rambus Inc.

2. The Amended and Restated Certificate of Incorporation of the Corporation as filed on May 29, 1997 (the "Certificate of Incorporation") is hereby amended by deleting in its entirety the first paragraph of Article FOURTH thereof and by substituting in lieu of said paragraph the following new paragraph:

> "IV. This Corporation is authorized to issue two classes of stock to be designated, respectively, 'Common Stock' and 'Preferred Stock.' The total number of shares which the Corporation is authorized to issue is five hundred five million (505,000,000) shares. Five hundred million (500,000,000) shares shall be Common Stock, each having a par value of one-tenth of one cent ($0.001). Five million (5,000,000) shares shall be Preferred Stock, each having a par value of one-tenth of one cent ($0.001), 160,000 shares of which shall be designated Series E Participating Preferred Stock ("Series E Preferred") and 4,840,000 shares of which shall be undesignated."

In addition, the Certificate of Incorporation is hereby further amended by inserting the following paragraph as the second paragraph of Article FOURTH thereof:

> "Upon the effectiveness of this Certificate of Amendment, every share of Common Stock outstanding or held by the Corporation in its treasury shall be changed and reclassified into four (4) shares of Common Stock, $0.001 par value per share, which shares be fully paid and nonassessable shares of Common Stock of the Corporation."

[remainder of page intentionally left blank]

3. The amendment of the certificate of incorporation herein certified has been duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

Signed this 14th day of June, 2000.

/s/ Edward Larsen

Edward Larsen, Sr. Vice President
Administration

Exhibit 4.3

DESCRIPTION OF SECURITIES

References to "Rambus" and the "Company" herein are, unless the context otherwise indicates, only to Rambus Inc. and not to any of its subsidiaries.

Description of Capital Stock

The following is a summary of the Company's capital stock and certain provisions of its Amended and Restated Certificate of Incorporation (the "**Certificate**") and Amended and Restated Bylaws (the "**Bylaws**"). This summary does not purport to be complete and is qualified in its entirety by the provisions of the Certificate and the Bylaws.

Capitalization

Our authorized capital stock consists of 505,000,000 shares of stock, including:

- 500,000,000 shares of common stock, par value of $0.001 per share (the "**Common Stock**"); and
- 5,000,000 shares of preferred stock, par value of $0.001 per share (the "**Preferred Stock**").

Common Stock

General. The Company is authorized to issue up to 500,000,000 shares of Common Stock.

Dividends. Subject to prior dividend rights of the holders of any shares of Preferred Stock of the Company, holders of shares of Common Stock are entitled to receive ratably dividends when, as and if declared by the Company's Board of Directors (the "**Board**") out of funds legally available for that purpose. Delaware law allows a corporation to pay dividends only out of surplus, as determined under Delaware law.

Voting Rights. Each share of Common Stock is entitled to one vote on all matters submitted to a vote of stockholders. The directors of the Company are elected by a plurality of the voting power of the shares present in person or represented by proxy. On all other matters, except for matters in the section titled "*Super Majority Voting Requirement*" below, submitted to the stockholders, the affirmative vote of the majority of the voting power of the shares present in person or represented by proxy shall be the act of the shareholders.

Super Majority Voting Requirement. The affirmative vote of sixty-six and two-thirds percent (66 2/3%) of the then issued and outstanding voting securities of the Company, voting together as a single class, shall be required for the amendment, repeal or modification of the provisions of Article VII or Article X of the Certificate or Sections 2.3 (Special Meeting), 2.11 (Stockholder Action by Written Consent without a Meeting), or 2.15 (Advance Notice of Stockholder Nominees and Stockholder Business) of the Bylaws.

Other Rights. In the event of a liquidation, dissolution or winding up of our company, the holders of common stock are entitled to share ratably in all assets remaining after payment of liabilities, subject to prior liquidation preferences of holders of convertible preferred stock, if any, then outstanding. The shares of Common Stock are not subject to redemption by operation of a sinking fund or otherwise. Holders of shares of Common Stock are not currently entitled to pre-emptive rights or conversion rights or other subscription rights.

Fully Paid. The issued and outstanding shares of Common Stock are fully paid and non-assessable. This means the full purchase price for the outstanding shares of Common Stock has been paid and the holders of such shares will not be assessed any additional amounts for such shares. Any additional shares of Common Stock that the Company may issue in the future will also be fully paid and non-assessable.

Transfer Agent and Registrar. The transfer agent and registrar for the Common Stock is Computershare Investor Services, LLC.

Listing. Our Common Stock is listed on the Nasdaq Global Select Market under the trading symbol "RMBS".

Preferred Stock

The Board is authorized to issue up to 5,000,000 shares of Preferred Stock from time to time in one or more series, to establish the number of shares to be included in each such series and to fix the designation, powers, preferences and rights of such shares and any qualifications, limitations or restrictions thereof. The issuance of Preferred Stock may have the effect of delaying, deferring or preventing a change in control of the Company without further action by the stockholders and may adversely affect the voting and other rights of the holders of Common Stock. The issuance of Preferred Stock with voting and conversion rights may adversely affect the voting power of the holders of Common Stock, including the loss of voting control to others.

Anti-takeover Effects of Our Certificate of Incorporation and Bylaws and Delaware Law

Some provisions of Delaware law, the Certificate and Bylaws could make the following more difficult:

- acquisition of the Company by means of a tender offer,
- acquisition of the Company by means of a proxy contest or otherwise, or
- removal of the Company's incumbent officers and directors.

These provisions, summarized below, are expected to discourage and prevent coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of the Company to first negotiate with the Board. They are also intended to provide our management with the flexibility to enhance the likelihood of continuity and stability if our Board determines that a takeover is not in our best interests or the best interests of the stockholders. These provisions, however, could have the effect of discouraging attempts to acquire us, which could deprive our stockholders of opportunities to sell their shares of Common Stock at prices higher than prevailing market prices. The Company believes that the benefits of these provisions, including increased protection, give it the potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure the Company and outweigh the disadvantages of discouraging takeover proposals, because negotiation of takeover proposals could result in an improvement of their terms.

Size of Board and Vacancies. The Bylaws provide that the Board will have one or more members, not to exceed ten members, which number will be determined from time to time by resolution of the Board. Our Certificate provides for a classified Board consisting of two classes of directors, each serving a staggered two-year term. The Certificate and Bylaws contain provisions that establish specific procedures for appointing and removing members of the Board. Under the Certificate and the Bylaws, vacancies and newly created directorships on the Board may be filled only by a majority of directors then serving on the Board. Under the Certificate and Bylaws, directors may be removed by stockholders only for cause.

Elimination of Stockholder Action by Written Consent. The Bylaws eliminate the right of the Company's stockholders to act by written consent. Stockholder action must take place at the annual or a special meeting of the Company's stockholders.

Stockholder Meetings. Under the Bylaws, only the chairperson of the Board, the president, the secretary or the majority of the authorized number of directors on the Board may call special meetings of the Company's stockholders.

Requirements for Advance Notification of Stockholder Nominations and Proposals. The Bylaws establish advance notice procedures with respect to stockholder proposals and nomination of candidates for election as directors.

Delaware Anti-takeover Law. The Company is governed by Section 203 of the Delaware General Corporation Law ("**Section 203**"), which prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years after the date that the stockholder became an interested stockholder, unless:

- before that date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;

- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the number of shares outstanding those shares owned by persons who are directors and also officers or which can be issued under employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or

- on or after that date, the business combination is approved by the board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least sixty-six and two-thirds percent (66 2/3%) of the outstanding voting stock that is not owned by the interested stockholder.

The restrictions set forth by Section 203 shall not apply if the interested stockholder becomes an interested stockholder inadvertently and as soon as practicable divests itself of ownership of sufficient shares as to cease to be an interested stockholder, and would not in the three years prior to the business combination, as defined below, have been an interested stockholder but for the inadvertent acquisition of ownership.

In general, Section 203 defines an interested stockholder as any entity or person who, with affiliates and associates, owns, or within the three-year period immediately prior to the business combination, beneficially owned 15% or more of the outstanding voting stock of the corporation. Section 203 defines business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;

- any sale, lease, exchange, mortgage, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder;

- subject to specified exceptions, any transaction that results in the issuance or transfer by the corporation or any majority-owned subsidiary of the corporation of any stock of the corporation or such subsidiary to the interested stockholder;

- any transaction involving the corporation that increases the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; or

- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

No Cumulative Voting. Neither the Certificate nor Bylaws provide for cumulative voting in the election of directors.

Undesignated Preferred Stock. The authorization of the Company's undesignated Preferred Stock makes it possible for the Board to issue Preferred Stock with voting or other rights or preferences that could impede the success of any attempt to change control of the Company.

Exhibit 21.1

SUBSIDIARIES OF REGISTRANT

Rambus Canada Inc.
Rambus Controllers, Inc.
Rambus Delaware LLC
Rambus International Ltd.
Rambus K.K. (Japan)
Rambus Ltd. (Grand Cayman Islands, BWI)
Rambus Chip Technologies (India) Private Limited
Rambus Korea, Inc. (South Korea)
Rambus France SAS
Rambus Global Inc.
Rambus Information Technology Consulting (Shanghai) Co. Ltd.
Rambus UK Ltd.
Rambus ROTW Holding B.V.
Cryptography Research, Inc.
Mozaik Multimedia, Inc.
Unity Semiconductor Corporation
AnalogX Inc. (Canada)
PLDA Group (France)
PLDA Ltd (Bulgaria)
PLDA SAS (France)
PLDA Inc. (United States of America)

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-28597, 333-38855, 333-67457, 333-93427, 333-48730, 333-52158, 333-86140, 333-103789, 333-115015, 333-124513, 333-146770, 333-159516, 333-181072, 333-191432, 333-195656, 333-203708, 333-225186, 333-233533 and 333-238809) of Rambus Inc. of our report dated February 28, 2022 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

San Jose, California
February 28, 2022

Exhibit 31.1

**CERTIFICATION PURSUANT TO RULE 13A-14(A) AND RULE 15D-14(A)
OF THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Luc Seraphin, certify that:

1. I have reviewed this Annual Report on Form 10-K of Rambus Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date:	February 28, 2022
By:	/s/ Luc Seraphin
Name:	Luc Seraphin
Title:	*Chief Executive Officer and President* *(Principal Executive Officer)*

Exhibit 31.2

**CERTIFICATION PURSUANT TO RULE 13A-14(A) AND RULE 15D-14(A)
OF THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Keith Jones, certify that:

1. I have reviewed this Annual Report on Form 10-K of Rambus Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date:	February 28, 2022
By:	/s/ Keith Jones
Name:	Keith Jones
Title:	*Vice President, Finance and Interim Chief Financial Officer (Principal Financial and Accounting Officer)*

Exhibit 32.1

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

I, Luc Seraphin, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Rambus Inc. on Form 10-K for the fiscal year ended December 31, 2021, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, and that information contained in such Annual Report on Form 10-K fairly presents in all material respects the financial condition and results of operations of Rambus Inc.

Date: February 28, 2022

By:	/s/ Luc Seraphin
Name:	Luc Seraphin
Title:	*Chief Executive Officer and President* *(Principal Executive Officer)*

Exhibit 32.2

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, Keith Jones, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Rambus Inc. on Form 10-K for the fiscal year ended December 31, 2021, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, and that information contained in such Annual Report on Form 10-K fairly presents in all material respects the financial condition and results of operations of Rambus Inc.

Date: February 28, 2022

By:	/s/ Keith Jones
Name:	Keith Jones
Title:	*Vice President, Finance and Interim Chief Financial Officer* *(Principal Financial and Accounting Officer)*