UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended September 30, 2023

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 000-15867

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CADENCE DESIGN SYSTEMS, INC.
(Exact Name of Registrant as Specified in Its Charter)

Delaware	**00-0000000**
(State or Other Jurisdiction of Incorporation or Organization)	**(I.R.S. Employer Identification No.)**
2655 Seely Avenue, Building 5, San Jose, California	**95134**
(Address of Principal Executive Offices)	**(Zip Code)**

(408) 943-1234
Registrant's Telephone Number, including Area Code

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, $0.01 par value per share	**CDNS**	**Nasdaq Global Select Market**

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

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

Indicate by check mark 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	☐	Smaller Reporting Company	☐
Non-accelerated Filer	☐			Emerging Growth Company	☐

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

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

On September 30, 2023, approximately 272,062,000 shares of the registrant's common stock, $0.01 par value, were outstanding.

CADENCE DESIGN SYSTEMS, INC.
INDEX

PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(In thousands)
(Unaudited)

	As of	
	September 30, 2023	December 31, 2022
ASSETS		
Current assets:		
Cash and cash equivalents	$ 961,982	$ 882,325
Receivables, net	426,505	486,710
Inventories	163,693	128,005
Prepaid expenses and other	272,283	209,727
Total current assets	1,824,463	1,706,767
Property, plant and equipment, net	379,776	371,451
Goodwill	1,500,442	1,374,268
Acquired intangibles, net	347,617	354,617
Deferred taxes	874,805	853,691
Other assets	504,272	476,277
Total assets	$ 5,431,375	$ 5,137,071
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Revolving credit facility	$ —	$ 100,000
Accounts payable and accrued liabilities	598,261	557,158
Current portion of deferred revenue	665,906	690,538
Total current liabilities	1,264,167	1,347,696
Long-term liabilities:		
Long-term portion of deferred revenue	100,609	91,524
Long-term debt	648,801	648,078
Other long-term liabilities	303,904	304,660
Total long-term liabilities	1,053,314	1,044,262
Commitments and contingencies (Note 15)		
Stockholders' equity:		
Common stock and capital in excess of par value	3,077,954	2,765,673
Treasury stock, at cost	(4,463,484)	(3,824,163)
Retained earnings	4,612,485	3,895,240
Accumulated other comprehensive loss	(113,061)	(91,637)
Total stockholders' equity	3,113,894	2,745,113
Total liabilities and stockholders' equity	$ 5,431,375	$ 5,137,071

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED INCOME STATEMENTS
(In thousands, except per share amounts)
(Unaudited)

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
Revenue:				
Product and maintenance	$ 965,840	$ 845,788	$ 2,852,372	$ 2,494,317
Services	57,254	56,766	168,991	167,524
Total revenue	1,023,094	902,554	3,021,363	2,661,841
Costs and expenses:				
Cost of product and maintenance	85,813	62,351	260,269	203,863
Cost of services	23,768	25,249	70,642	74,245
Marketing and sales	176,215	152,925	509,951	432,407
Research and development	369,642	323,629	1,074,353	901,121
General and administrative	58,556	73,688	166,688	174,051
Amortization of acquired intangibles	4,612	3,946	13,181	13,543
Restructuring	11,582	14	11,582	42
Total costs and expenses	730,188	641,802	2,106,666	1,799,272
Income from operations	292,906	260,752	914,697	862,569
Interest expense	(9,059)	(5,463)	(27,196)	(13,852)
Other income (expense), net	16,106	(3,017)	32,363	(13,879)
Income before provision for income taxes	299,953	252,272	919,864	834,838
Provision for income taxes	45,632	65,967	202,619	226,278
Net income	$ 254,321	$ 186,305	$ 717,245	$ 608,560
Net income per share – basic	$ 0.94	$ 0.69	$ 2.66	$ 2.24
Net income per share – diluted	$ 0.93	$ 0.68	$ 2.63	$ 2.21
Weighted average common shares outstanding – basic	269,229	271,131	269,480	271,694
Weighted average common shares outstanding – diluted	272,427	274,957	272,859	275,683

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In thousands)
(Unaudited)

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
Net income	$ 254,321	$ 186,305	$ 717,245	$ 608,560
Other comprehensive loss, net of tax effects:				
Foreign currency translation adjustments	(21,692)	(40,768)	(20,546)	(90,764)
Changes in defined benefit plan liabilities	132	15	537	1,942
Unrealized losses on investments	(991)	—	(1,415)	—
Total other comprehensive loss, net of tax effects	(22,551)	(40,753)	(21,424)	(88,822)
Comprehensive income	$ 231,770	$ 145,552	$ 695,821	$ 519,738

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)
(Unaudited)

	Three Months Ended September 30, 2023					
	Common Stock					
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, June 30, 2023	271,790	$ 2,897,885	$ (4,257,084)	$ 4,358,164	$ (90,510)	$ 2,908,455
Net income	—	—	—	254,321	—	$ 254,321
Other comprehensive loss, net of taxes	—	—	—	—	(22,551)	$ (22,551)
Purchase of treasury stock	(811)	—	(125,008)	—	—	$ (125,008)
Equity forward contract		61,688	(61,688)			$ —
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	1,230	39,810	14,029	—	—	$ 53,839
Stock received for payment of employee taxes on vesting of restricted stock	(147)	(9,461)	(33,733)	—	—	$ (43,194)
Stock-based compensation expense	—	88,032	—	—	—	$ 88,032
Balance, September 30, 2023	272,062	$ 3,077,954	$ (4,463,484)	$ 4,612,485	$ (113,061)	$ 3,113,894

	Three Months Ended October 1, 2022					
	Common Stock					
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, July 2, 2022	273,870	$ 2,590,893	$ (3,352,827)	$ 3,468,543	$ (81,380)	$ 2,625,229
Net income	—	—	—	186,305	—	$ 186,305
Other comprehensive loss, net of taxes	—	—	—	—	(40,753)	$ (40,753)
Purchase of treasury stock	(959)	—	(150,013)	—	—	$ (150,013)
Equity forward contract	—	17,965	(17,965)	—	—	$ —
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	1,574	23,095	30,363	—	—	$ 53,458
Stock received for payment of employee taxes on vesting of restricted stock	(169)	(7,772)	(31,777)	—	—	$ (39,549)
Stock-based compensation expense	—	73,451	—	—	—	$ 73,451
Balance, October 1, 2022	274,316	$ 2,697,632	$ (3,522,219)	$ 3,654,848	$ (122,133)	$ 2,708,128

	Nine Months Ended September 30, 2023					
	Common Stock					
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, December 31, 2022	272,675	$ 2,765,673	$ (3,824,163)	$ 3,895,240	$ (91,637)	$ 2,745,113
Net income	—	—	—	717,245	—	$ 717,245
Other comprehensive loss, net of taxes	—	—	—	—	(21,424)	$ (21,424)
Purchase of treasury stock	(2,657)	—	(515,127)	—	—	$ (515,127)
Equity forward contract		1,688	(61,688)	—	—	$ (60,000)
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	2,527	91,894	39,447	—	—	$ 131,341
Stock received for payment of employee taxes on vesting of restricted stock	(483)	(20,229)	(101,953)	—	—	$ (122,182)
Stock-based compensation expense	—	238,928	—	—	—	$ 238,928
Balance, September 30, 2023	272,062	$ 3,077,954	$ (4,463,484)	$ 4,612,485	$ (113,061)	$ 3,113,894

	Nine Months Ended October 1, 2022					
	Common Stock					
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, January 1, 2022	276,796	$ 2,467,701	$ (2,740,003)	$ 3,046,288	$ (33,311)	$ 2,740,675
Net income	—	—	—	608,560	—	$ 608,560
Other comprehensive loss, net of taxes	—	—	—	—	(88,822)	$ (88,822)
Purchase of treasury stock	(4,664)	—	(720,062)	—	—	$ (720,062)
Equity forward contract	—	(12,035)	(17,965)	—	—	$ (30,000)
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	2,738	60,327	43,353	—	—	$ 103,680
Stock received for payment of employee taxes on vesting of restricted stock	(554)	(15,551)	(87,542)	—	—	$ (103,093)
Stock-based compensation expense	—	197,190	—	—	—	$ 197,190
Balance, October 1, 2022	274,316	$ 2,697,632	$ (3,522,219)	$ 3,654,848	$ (122,133)	$ 2,708,128

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)
(Unaudited)

	Nine Months Ended	
	September 30, 2023	October 1, 2022
Cash and cash equivalents at beginning of period	$ 882,325	$ 1,088,940
Cash flows from operating activities:		
Net income	717,245	608,560
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	106,783	98,178
Amortization of debt discount and fees	942	810
Stock-based compensation	238,928	197,190
(Gain) loss on investments, net	(12,732)	4,777
Deferred income taxes	(23,506)	(49,834)
Provisions for losses on receivables	1,692	471
ROU asset amortization and change in operating lease liabilities	(2,684)	(883)
Other non-cash items	1,962	158
Changes in operating assets and liabilities, net of effect of acquired businesses:		
Receivables	50,024	(57,309)
Inventories	(47,293)	(8,020)
Prepaid expenses and other	33,307	30,596
Other assets	(26,580)	17,644
Accounts payable and accrued liabilities	43,111	24,514
Deferred revenue	(14,628)	113,712
Other long-term liabilities	10,514	(2,305)
Net cash provided by operating activities	1,077,085	978,259
Cash flows from investing activities:		
Purchases of investments	(145,150)	(1,000)
Proceeds from the sale and maturity of investments	64,174	—
Purchases of property, plant and equipment	(68,634)	(86,295)
Purchases of intangible assets	—	(1,000)
Cash paid in business combinations, net of cash acquired	(163,963)	(586,163)
Net cash used for investing activities	(313,573)	(674,458)
Cash flows from financing activities:		
Proceeds from term loan	—	300,000
Proceeds from revolving credit facility	50,000	450,000
Payments on revolving credit facility	(150,000)	(300,000)
Payment of debt issuance costs	—	(425)
Proceeds from issuance of common stock	131,341	103,682
Stock received for payment of employee taxes on vesting of restricted stock	(122,182)	(103,093)
Payments for repurchases of common stock	(575,127)	(750,062)
Net cash used for financing activities	(665,968)	(299,898)
Effect of exchange rate changes on cash and cash equivalents	(17,887)	(66,792)
Increase (decrease) in cash and cash equivalents	79,657	(62,889)
Cash and cash equivalents at end of period	$ 961,982	$ 1,026,051
Supplemental cash flow information:		
Cash paid for interest	$ 22,226	$ 8,508
Cash paid for income taxes, net	104,721	148,151

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Unaudited)

NOTE 1. BASIS OF PRESENTATION AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

The condensed consolidated financial statements included in this Quarterly Report on Form 10-Q have been prepared by Cadence Design Systems, Inc. ("Cadence") without audit, pursuant to the rules and regulations of the United States Securities and Exchange Commission (the "SEC"). Certain information and footnote disclosures normally included in consolidated financial statements prepared in accordance with United States generally accepted accounting principles ("U.S. GAAP") have been condensed or omitted pursuant to such rules and regulations. However, Cadence believes that the disclosures contained in this Quarterly Report on Form 10-Q comply with the requirements of Section 13(a) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") for a Quarterly Report on Form 10-Q and are adequate to make the information presented not misleading. These condensed consolidated financial statements are meant to be, and should be, read in conjunction with the consolidated financial statements and the notes thereto included in Cadence's Annual Report on Form 10-K for the fiscal year ended December 31, 2022.

The unaudited condensed consolidated financial statements included in this Quarterly Report on Form 10-Q reflect all adjustments (which include only normal, recurring adjustments and those items discussed in these Notes) that are, in the opinion of management, necessary to state fairly the results of operations, cash flows and financial position for the periods and dates presented. The results for such periods are not necessarily indicative of the results to be expected for the full fiscal year. Certain prior period balances have been reclassified to conform to the current period presentation. Management has evaluated subsequent events through the issuance date of the unaudited condensed consolidated financial statements.

Fiscal Year End

In fiscal 2022, Cadence's Board of Directors approved a change in its fiscal year end from the Saturday closest to December 31 of each year to December 31 of each year. The fiscal year change became effective with Cadence's 2023 fiscal year, which began on January 1, 2023. Cadence's fiscal quarters now end on March 31, June 30, and September 30. No transition report is required in connection with this change.

Use of Estimates

Preparation of the condensed consolidated financial statements in conformity with U.S. GAAP 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 condensed consolidated financial statements and the reported amounts of revenue and expenses during the reporting period.

Despite continued uncertainty and disruption in the macroeconomic and geopolitical environment, Cadence is not aware of any specific event or circumstance that would require an update to its estimates or judgments or a revision of the carrying value of its assets or liabilities as of October 23, 2023, the date of issuance of this Quarterly Report on Form 10-Q. These estimates may change, as new events or developments occur and additional information is obtained. Actual results could differ materially from these estimates under different assumptions or conditions.

Recently Adopted Accounting Standards

There have been no recent accounting standard updates that are material or potentially material to Cadence.

NOTE 2. REVENUE

Cadence groups its products and services into five categories related to major design activities. The following table shows the percentage of revenue contributed by each of Cadence's five product categories for the three and nine months ended September 30, 2023 and October 1, 2022:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
Custom Integrated Circuit ("IC") Design and Simulation	22 %	22 %	21 %	22 %
Digital IC Design and Signoff	28 %	29 %	27 %	28 %
Functional Verification, including Emulation and Prototyping Hardware*	26 %	25 %	29 %	26 %
Intellectual Property ("IP")	11 %	12 %	11 %	13 %
System Design and Analysis	13 %	12 %	12 %	11 %
Total	100 %	100 %	100 %	100 %

* Includes immaterial amount of revenue accounted for under leasing arrangements.

Cadence generates revenue from contracts with customers and applies judgment in identifying and evaluating any terms and conditions in contracts which may impact revenue recognition. Certain of Cadence's licensing arrangements allow customers the ability to remix among software products. Cadence also has arrangements with customers that include a combination of products, with the actual product selection and number of licensed users to be determined at a later date. For these arrangements, Cadence estimates the allocation of the revenue to product categories based upon the expected usage of products. Revenue by product category fluctuates from period to period based on demand for products and services, and Cadence's available resources to deliver them. No single customer accounted for 10% or more of total revenue during the three and nine months ended September 30, 2023 or October 1, 2022.

Approximately 85% of Cadence's annual revenue is characterized as recurring revenue. Recurring revenue includes revenue recognized over time from Cadence's software arrangements, services, royalties, maintenance on IP licenses and hardware, and operating leases of hardware. Recurring revenue also includes revenue recognized at varying points in time over the term of other arrangements with non-cancelable commitments, whereby the customer commits to a fixed dollar amount over a specified period of time that can be used to purchase from a list of products or services. These arrangements do not meet the definition of a revenue contract until the customer executes a separate selection form to identify the products and services that they are purchasing. Each separate selection form under the arrangement is treated as an individual contract and accounted for based on the respective performance obligations.

The remainder of Cadence's revenue is recognized at a point in time and is characterized as up-front revenue. Up-front revenue is primarily generated by sales of emulation and prototyping hardware and individual IP licenses. The percentage of Cadence's recurring and up-front revenue is impacted by delivery of hardware and IP products to its customers in any single fiscal period.

The following table shows the percentage of Cadence's revenue that is classified as recurring or up-front for the three and nine months ended September 30, 2023 and October 1, 2022:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
Revenue recognized over time	83 %	81 %	80 %	82 %
Revenue from arrangements with non-cancelable commitments	2 %	3 %	3 %	2 %
Recurring revenue	85 %	84 %	83 %	84 %
Up-front revenue	15 %	16 %	17 %	16 %
Total	100 %	100 %	100 %	100 %

Significant Judgments

Cadence's contracts with customers often include promises to transfer to a customer multiple software and/or IP licenses and services, including professional services, technical support services, and rights to unspecified updates. Determining whether licenses and services are distinct performance obligations that should be accounted for separately, or not distinct and thus accounted for together, requires significant judgment. In some arrangements, such as most of Cadence's IP license arrangements, Cadence has concluded that the licenses and associated services are distinct from each other. In others, like Cadence's time-based software arrangements, the licenses and certain services are not distinct from each other. Cadence's time-based software arrangements include multiple software licenses and updates to the licensed software products, as well as technical support, and Cadence has concluded that these promised goods and services are a single, combined performance obligation.

The accounting for contracts with multiple performance obligations requires the contract's transaction price to be allocated to each distinct performance obligation based on relative stand-alone selling price ("SSP"). Judgment is required to determine the SSP for each distinct performance obligation because Cadence rarely licenses or sells products on a standalone basis. In instances where the SSP is not directly observable because Cadence does not sell the license, product or service separately, Cadence determines the SSP using information that maximizes the use of observable inputs and may include market conditions. Cadence typically has more than one SSP for individual performance obligations due to the stratification of those items by classes of customers and circumstances. In these instances, Cadence may use information such as the size of the customer and geographic region of the customer in determining the SSP.

Revenue is recognized over time for Cadence's combined performance obligations that include software licenses, updates, technical support and maintenance that are separate performance obligations with the same term. For Cadence's professional services, revenue is recognized over time, generally using costs incurred or hours expended to measure progress. Judgment is required in estimating project status and the costs necessary to complete projects. A number of internal and external factors can affect these estimates, including labor rates, utilization and efficiency variances and specification and testing requirement changes. For Cadence's other performance obligations recognized over time, revenue is generally recognized using a time-based measure of progress reflecting generally consistent efforts to satisfy those performance obligations throughout the arrangement term.

If a group of agreements are so closely related that they are, in effect, part of a single arrangement, such agreements are deemed to be one arrangement for revenue recognition purposes. Cadence exercises significant judgment to evaluate the relevant facts and circumstances in determining whether the separate agreements should be accounted for separately or as, in substance, a single arrangement. Cadence's judgments about whether a group of contracts comprise a single arrangement can affect the allocation of consideration to the distinct performance obligations, which could have an effect on results of operations for the periods involved.

Cadence is required to estimate the total consideration expected to be received from contracts with customers. In limited circumstances, the consideration expected to be received is variable based on the specific terms of the contract or based on Cadence's expectations of the term of the contract. Generally, Cadence has not experienced significant returns or refunds to customers. These estimates require significant judgment and a change in these estimates could have an effect on its results of operations during the periods involved.

Contract Balances

The timing of revenue recognition may differ from the timing of invoicing to customers, and these timing differences result in receivables, contract assets, or contract liabilities (deferred revenue) on Cadence's condensed consolidated balance sheets. For certain software, hardware and IP agreements with payment plans, Cadence records an unbilled receivable related to revenue recognized upon transfer of control because it has an unconditional right to invoice and receive payment in the future related to those transferred products or services. Cadence records a contract asset when revenue is recognized prior to invoicing and Cadence does not have the unconditional right to invoice or retains performance risk with respect to that performance obligation. Cadence records deferred revenue when revenue is recognized subsequent to invoicing. For Cadence's time-based software agreements, customers are generally invoiced in equal, quarterly amounts, although some customers prefer to be invoiced in single or annual amounts.

The contract assets indicated below are included in prepaid expenses and other in the condensed consolidated balance sheets and primarily relate to Cadence's rights to consideration for work completed but not billed as of the balance sheet date on services and customized IP contracts. The contract assets are transferred to receivables when the rights become unconditional, usually upon completion of a milestone.

Cadence's contract balances as of September 30, 2023 and December 31, 2022 were as follows:

	As of	
	September 30, 2023	December 31, 2022
	(In thousands)	
Contract assets	$ 14,353	$ 22,766
Deferred revenue	766,515	782,062

Cadence recognized revenue of $106.6 million and $632.4 million during the three and nine months ended September 30, 2023, and $63.9 million and $488.9 million during the three and nine months ended October 1, 2022, that was included in the deferred revenue balance at the beginning of each respective fiscal year. All other activity in deferred revenue is due to the timing of invoices in relation to the timing of revenue as described above.

Payment terms and conditions vary by contract type, although terms generally include a requirement of payment within 30 to 60 days. In instances where the timing of revenue recognition differs from the timing of invoicing, Cadence has determined that its contracts generally do not include a significant financing component. The primary purpose of invoicing terms is to provide customers with simplified and predictable ways of purchasing Cadence's products and services, and not to facilitate financing arrangements.

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. Cadence has elected to exclude the potential future royalty receipts from the remaining performance obligations. Contracted but unsatisfied performance obligations were approximately $5.4 billion as of September 30, 2023, which included $0.4 billion of non-cancelable commitments from customers where actual product selection and quantities of specific products or services are to be determined by customers at a later date. As of September 30, 2023, Cadence expected to recognize 54% of the contracted but unsatisfied performance obligations, excluding non-cancelable commitments, as revenue over the next 12 months.

Cadence recognized revenue of $13.5 million and $40.3 million during the three and nine months ended September 30, 2023, and $12.1 million and $35.2 million during the three and nine months ended October 1, 2022, from performance obligations satisfied in previous periods. These amounts represent royalties earned during the period and exclude contracts with nonrefundable prepaid royalties. Nonrefundable prepaid royalties are recognized upon delivery of the IP because Cadence's right to the consideration is not contingent upon customers' future shipments.

NOTE 3. RECEIVABLES, NET

Cadence's current and long-term receivables balances as of September 30, 2023 and December 31, 2022 were as follows:

	As of	
	September 30, 2023	December 31, 2022
	(In thousands)	
Accounts receivable	$ 264,580	$ 314,666
Unbilled accounts receivable	164,827	174,334
Long-term receivables	9,009	2,735
Total receivables	438,416	491,735
Less allowance for doubtful accounts	(2,902)	(2,290)
Total receivables, net	$ 435,514	$ 489,445

Cadence's customers are primarily concentrated within the semiconductor and electronics systems industries. As of September 30, 2023 and December 31, 2022, no single customer accounted for 10% or more of Cadence's total receivables.

NOTE 4. DEBT

Cadence's outstanding debt as of September 30, 2023 and December 31, 2022 was as follows:

	September 30, 2023			December 31, 2022		
	(In thousands)					
	Principal	Unamortized Discount	Carrying Value	Principal	Unamortized Discount	Carrying Value
Revolving Credit Facility	$ —	$ —	$ —	$ 100,000	$ —	$ 100,000
2024 Notes	350,000	(936)	349,064	350,000	(1,581)	348,419
2025 Term Loan	300,000	(263)	299,737	300,000	(341)	299,659
Total outstanding debt	$ 650,000	$ (1,199)	$ 648,801	$ 750,000	$ (1,922)	$ 748,078

Revolving Credit Facility

In June 2021, Cadence entered into a five-year senior unsecured revolving credit facility with a group of lenders led by Bank of America, N.A, as administrative agent (the "2021 Credit Facility"). In September 2022, Cadence amended the 2021 Credit Facility to, among other things, allow Cadence to change its fiscal year to match the calendar year commencing in 2023 and change the interest rate benchmark for loans under the 2021 Credit Facility from the London Inter-Bank Offered Rate ("LIBOR") to Term Secured Overnight Financing Rate ("SOFR"). The material terms of the 2021 Credit Facility otherwise remain unchanged.

The 2021 Credit Facility provides for borrowings up to $700.0 million, with the right to request increased capacity up to an additional $350.0 million upon the receipt of lender commitments, for total maximum borrowings of $1.05 billion. The 2021 Credit Facility expires on June 30, 2026. Any outstanding loans drawn under the 2021 Credit Facility are due at maturity on June 30, 2026, subject to an option to extend the maturity date. Outstanding borrowings may be repaid at any time prior to maturity. Debt issuance costs of $1.3 million were recorded to other assets in Cadence's condensed consolidated balance sheet at the inception of the agreement and are being amortized to interest expense over the term of the 2021 Credit Facility.

Interest accrues on borrowings under the 2021 Credit Facility at a rate equal to, at Cadence's option, either (1) SOFR plus a margin between 0.750% and 1.250% per annum, determined by reference to the credit rating of Cadence's unsecured debt, plus a SOFR adjustment of 0.10% or (2) the base rate plus a margin between 0.000% and 0.250% per annum, determined by reference to the credit rating of Cadence's unsecured debt. A commitment fee ranging from 0.070% to 0.175% is assessed on the daily average undrawn portion of revolving commitments. Borrowings bear interest at what is estimated to be current market rates of interest. Accordingly, the carrying value of the 2021 Credit Facility approximates fair value.

The 2021 Credit Facility contains customary negative covenants that, among other things, restrict Cadence's ability to incur additional indebtedness, grant liens and make certain asset dispositions. In addition, the 2021 Credit Facility contains financial covenants that require Cadence to maintain a funded debt to EBITDA ratio not greater than 3.25 to 1, with a step up to 3.75 to 1 for one year following an acquisition by Cadence of at least $250.0 million that results in a pro forma leverage ratio between 3.00 to 1 and 3.50 to 1. As of September 30, 2023, Cadence was in compliance with all financial covenants associated with the 2021 Credit Facility.

2024 Notes

In October 2014, Cadence issued a $350.0 million aggregate principal amount of 4.375% Senior Notes due October 15, 2024 (the "2024 Notes"). Cadence received net proceeds of $342.4 million from the issuance of the 2024 Notes, net of a discount of $1.4 million and issuance costs of $6.2 million. Both the discount and issuance costs are being amortized to interest expense over the term of the 2024 Notes using the effective interest method. Interest is payable in cash semi-annually in April and October. The 2024 Notes are unsecured and rank equal in right of payment to all of Cadence's existing and future senior indebtedness. The fair value of the 2024 Notes was approximately $345.7 million as of September 30, 2023.

Cadence may redeem the 2024 Notes, in whole or in part, at a redemption price equal to the greater of (a) 100% of the principal amount of the notes to be redeemed and (b) the sum of the present values of the remaining scheduled payments of principal and interest, plus any accrued and unpaid interest, as more particularly described in the indenture governing the 2024 Notes.

The indenture governing the 2024 Notes includes customary representations, warranties and restrictive covenants, including, but not limited to, restrictions on Cadence's ability to grant liens on assets, enter into sale and lease-back transactions, or merge, consolidate or sell assets, and also includes customary events of default.

2025 Term Loan

In September 2022, Cadence entered into a $300.0 million three-year senior non-amortizing term loan facility due on September 7, 2025 with a group of lenders led by Bank of America, N.A., as administrative agent (the "2025 Term Loan"). The 2025 Term Loan is unsecured and ranks equal in right of payment to all of Cadence's unsecured indebtedness. Proceeds from the loan were used to fund Cadence's acquisition of OpenEye Scientific Software, Inc. Debt issuance costs associated with the 2025 Term Loan were not material.

Amounts outstanding under the 2025 Term Loan accrue interest at a rate equal to, at Cadence's option, either (1) Term SOFR plus a margin between 0.625% and 1.125% per annum, determined by reference to the credit rating of Cadence's unsecured debt, plus a SOFR adjustment of 0.10% or (2) base rate plus a margin between 0.000% and 0.125% per annum, determined by reference to the credit rating of Cadence's unsecured debt. As of September 30, 2023, the interest rate on the 2025 Term Loan was 6.18%. Interest is payable quarterly. Borrowings bear interest at what is estimated to be current market rates of interest. Accordingly, the carrying value of the 2025 Term Loan approximates fair value.

The 2025 Term Loan contains customary negative covenants that, among other things, restrict Cadence's ability to incur additional indebtedness, grant liens and make certain asset dispositions. In addition, the 2025 Term Loan contains a financial covenant that requires Cadence to maintain a funded debt to EBITDA ratio not greater than 3.25 to 1, with a step-up to 3.75 to 1 for one year following an acquisition by Cadence of at least $250.0 million that results in a pro forma leverage ratio between 3.00 to 1 and 3.50 to 1. As of September 30, 2023, Cadence was in compliance with all financial covenants associated with the 2025 Term Loan.

NOTE 5. ACQUISITIONS

On September 6, 2023, Cadence acquired the serializer/deserializer ("SerDes") and memory interface physical layer ("Memory") IP business from Rambus Inc. ("Rambus") for an aggregate cash consideration of $108.6 million. Memory and SerDes IP design and integration continues to be integral to the design of artificial intelligence, data center and hyperscale applications, CPU architectures and networking devices. The addition of the Rambus IP and seasoned team accelerates Cadence's Intelligent System Design strategy and strengthens Cadence's IP technology portfolio.

The total purchase consideration was allocated to the assets acquired and liabilities assumed based on their respective fair values on the acquisition date as follows:

	Fair Value (In thousands)
Current assets	$ 1,460
Goodwill	80,999
Acquired intangibles	26,000
Other long-term assets	2,798
Total assets acquired	111,257
Current liabilities	2,531
Long-term liabilities	142
Total liabilities assumed	2,673
Total purchase consideration	$ 108,584

The allocation of purchase consideration to certain assets and liabilities has not been finalized. Cadence will continue to evaluate certain estimates and assumptions, primarily related to assumed liabilities, during the measurement period (up to one year from the acquisition date). The recorded goodwill is attributed to intangible assets that do not qualify for separate recognition, including the acquired assembled workforce, and will be deductible for tax purposes.

Definite-lived intangible assets acquired with Cadence's acquisition of the SerDes and Memory business from Rambus were as follows:

	Fair Value	Weighted Average Amortization Period
	(In thousands)	(in years)
Existing technology	$ 16,700	5.0 years
Agreements and relationships	9,300	7.0 years
Total acquired intangibles with definite lives	$ 26,000	5.7 years

On May 4, 2023, Cadence acquired all of the outstanding equity of Pulsic, Ltd. ("Pulsic"), a longtime provider of production-proven technology for floor-planning, placement, and routing of custom ICs. The addition of Pulsic's technologies and experienced team supports Cadence's Intelligent System Design strategy and strengthens Cadence's Custom IC Design and Simulation technology portfolio. The aggregate cash consideration for Cadence's acquisition of Pulsic, net of cash acquired of $3.8 million, was $56.1 million. Subject to service and other conditions, Cadence expects to recognize expense for consideration paid to certain former Pulsic shareholders, now employed by Cadence, through the second quarter of fiscal 2025.

The total purchase consideration was allocated to the assets acquired and liabilities assumed with Cadence's acquisition of Pulsic based on their respective fair values on the acquisition date as follows:

	Fair Value
	(In thousands)
Current assets	$ 4,369
Goodwill	47,448
Acquired intangibles	12,400
Other long-term assets	89
Total assets acquired	64,306
Current liabilities	1,553
Long-term liabilities	2,885
Total liabilities assumed	4,438
Total purchase consideration	$ 59,868

The recorded goodwill is attributed to intangible assets that do not qualify for separate recognition, including the acquired assembled workforce, and will not be deductible for tax purposes.

Definite-lived intangible assets acquired with Cadence's acquisition of Pulsic were as follows:

	Fair Value	Weighted Average Amortization Period
	(In thousands)	(in years)
Existing technology	$ 8,000	6.2 years
Agreements and relationships	4,100	8.0 years
Tradenames, trademarks and patents	300	6.0 years
Total acquired intangibles with definite lives	$ 12,400	6.8 years

Pro Forma Financial Information

Cadence has not presented pro forma financial information for the businesses acquired during fiscal 2023 because the results of operations for these businesses are not material to Cadence's condensed consolidated financial statements.

Acquisition-Related Transaction Costs

Transaction costs associated with acquisitions, which consist of professional fees and administrative costs, are expensed as incurred and are included in general and administrative expense in Cadence's condensed consolidated income statement. During the three and nine months ended September 30, 2023, transaction costs associated with acquisitions were $4.3 million and $10.3 million, respectively. During the three and nine months ended October 1, 2022, transaction costs associated with acquisitions were $3.6 million and $10.1 million, respectively.

NOTE 6. GOODWILL AND ACQUIRED INTANGIBLES

Goodwill

The changes in the carrying amount of goodwill during the nine months ended September 30, 2023 were as follows:

	Gross Carrying Amount
	(In thousands)
Balance as of December 31, 2022	$ 1,374,268
Goodwill resulting from acquisitions	128,447
Effect of foreign currency translation	(2,273)
Balance as of September 30, 2023	$ 1,500,442

Acquired Intangibles, Net

Acquired intangibles as of September 30, 2023 were as follows, excluding intangibles that were fully amortized as of December 31, 2022:

	Gross Carrying Amount	Accumulated Amortization	Acquired Intangibles, Net
		(In thousands)	
Existing technology	$ 323,359	$ (129,807)	$ 193,552
Agreements and relationships	194,625	(56,671)	137,954
Tradenames, trademarks and patents	13,242	(3,931)	9,311
Total acquired intangibles with definite lives	531,226	(190,409)	340,817
In-process technology	6,800	—	6,800
Total acquired intangibles	$ 538,026	$ (190,409)	$ 347,617

In-process technology as of September 30, 2023 consisted of acquired projects that, if completed, will contribute to Cadence's existing product offerings. As of September 30, 2023, these projects were expected to be completed during the first quarter of fiscal 2024. During the three and nine months ended September 30, 2023, there were no transfers from in-process technology to existing technology.

Acquired intangibles as of December 31, 2022 were as follows, excluding intangibles that were fully amortized as of January 1, 2022:

	Gross Carrying Amount	Accumulated Amortization	Acquired Intangibles, Net
		(In thousands)	
Existing technology	$ 479,796	$ (278,851)	$ 200,945
Agreements and relationships	274,624	(137,847)	136,777
Tradenames, trademarks and patents	12,979	(2,884)	10,095
Total acquired intangibles with definite lives	$ 767,399	$ (419,582)	$ 347,817
In-process technology	6,800	—	6,800
Total acquired intangibles	$ 774,199	$ (419,582)	$ 354,617

Amortization expense from existing technology and maintenance agreements is included in cost of product and maintenance. Amortization expense for the three and nine months ended September 30, 2023 and October 1, 2022 by condensed consolidated income statement caption was as follows:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
		(In thousands)		
Cost of product and maintenance	$ 10,991	$ 8,867	$ 31,869	$ 30,906
Amortization of acquired intangibles	4,612	3,946	13,181	13,543
Total amortization of acquired intangibles	$ 15,603	$ 12,813	$ 45,050	$ 44,449

As of September 30, 2023, the estimated amortization expense for intangible assets with definite lives was as follows for the following five fiscal years and thereafter:

	(In thousands)
2023 - remaining period	$ 16,309
2024	63,382
2025	50,658
2026	44,879
2027	42,438
2028	38,371
Thereafter	84,780
Total estimated amortization expense	$ 340,817

NOTE 7. STOCK-BASED COMPENSATION

Stock-based compensation expense is reflected in Cadence's condensed consolidated income statements for the three and nine months ended September 30, 2023 and October 1, 2022 as follows:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
	(In thousands)			
Cost of product and maintenance	$ 1,191	$ 1,046	$ 3,292	$ 2,751
Cost of services	1,516	1,331	4,190	3,494
Marketing and sales	18,042	14,991	48,819	39,650
Research and development	53,013	43,327	142,142	115,516
General and administrative	14,270	12,756	40,485	35,779
Total stock-based compensation expense	$ 88,032	$ 73,451	$ 238,928	$ 197,190

Cadence had total unrecognized compensation expense related to stock option and restricted stock grants of $621.5 million as of September 30, 2023, which will be recognized over a weighted average vesting period of 2.0 years.

NOTE 8. STOCK REPURCHASE PROGRAM

In August 2023, Cadence's Board of Directors increased the prior authorization to repurchase shares of Cadence common stock by authorizing an additional $1.0 billion. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors.

During the three and nine months ended September 30, 2023, Cadence repurchased approximately 0.5 million and 1.8 million shares on the open market, for an aggregate purchase price of $125 million and $375 million, respectively.

In June 2023, Cadence also entered into an accelerated share repurchase ("ASR") agreement with HSBC Bank USA, National Association ("HSBC") to repurchase an aggregate of $200.0 million of Cadence common stock. The ASR agreement was accounted for as two separate transactions (1) a repurchase of common stock and (2) an equity-linked contract on Cadence's own stock. In June 2023, Cadence received an initial share delivery of approximately 0.6 million shares, which represented the number of shares at a market price equal to $140.0 million. An equity-linked contract for $60 million, representing the remaining shares to be delivered by HSBC under the ASR agreement, was recorded to stockholders' equity as of June 30, 2023. In August 2023, the ASR agreement settled and resulted in a delivery of approximately 0.3 million additional shares to Cadence. In total, Cadence received approximately 0.9 million shares under the ASR agreement at an average price per share of $228.26. The shares received were treated as repurchased common stock for purposes of calculating earnings per share.

As of September 30, 2023, approximately $1.5 billion of Cadence's share repurchase authorization remained available to repurchase shares of Cadence common stock.

The shares repurchased under Cadence's repurchase authorizations and the total cost of repurchased shares, including commissions, during the three and nine months ended September 30, 2023 and October 1, 2022 were as follows:

	Three Months Ended		Nine Months Ended	
	September 30, 2023*	October 1, 2022**	September 30, 2023	October 1, 2022
	(In thousands)			
Shares repurchased	811	959	2,657	4,664
Total cost of repurchased shares	$ 185,008	$ 180,013	$ 575,127	$ 750,062

*Includes 276 thousand shares and $60 million equity forward contract from the June 2023 ASR settled in August 2023.

**Includes 109 thousand shares and $30 million equity forward contract from the June 2022 ASR settled in September 2022.

NOTE 9. RESTRUCTURING

In August 2023, Cadence initiated a restructuring plan (the "2023 Restructuring Plan") designed to better align its resources with its business strategy. The charges incurred with the 2023 Restructuring Plan during the three and nine months ended September 30, 2023, are comprised of severance payments and termination benefits related to headcount reductions and are included in restructuring on Cadence's condensed consolidated income statements.

In addition to headcount reductions, Cadence is evaluating certain facilities for closure as part of the 2023 Restructuring Plan. During the three and nine months ended September 30, 2023, no facility-related restructuring charges were incurred, and charges in future periods for the facilities under consideration are not expected to exceed $5 million.

The following table presents activity for the 2023 Restructuring Plan during the nine months ended September 30, 2023:

	Severance and Benefits
	(In thousands)
Balance as of December 31, 2022	$ —
Restructuring charges	11,582
Cash payments	(2,620)
Effect of foreign currency translation	(117)
Balance as of September 30, 2023	$ 8,845

All liabilities for severance and related benefits under the 2023 Restructuring Plan are included in accounts payable and accrued liabilities on Cadence's condensed consolidated balance sheets as of September 30, 2023. Cadence expects to make cash payments to settle these liabilities through the first half of fiscal 2024.

NOTE 10. OTHER INCOME (EXPENSE), NET

Cadence's other income (expense), net, for the three and nine months ended September 30, 2023 and October 1, 2022 are as follows:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
	(In thousands)			
Interest income	$ 8,453	$ 3,051	$ 22,253	$ 4,941
Gains (losses) on marketable equity investments	14,339	(408)	14,960	(1,993)
Losses on non-marketable equity investments	(1,050)	(1,246)	(2,225)	(2,786)
Gains (losses) on securities in Non-Qualified Deferred Compensation ("NQDC") trust	(1,749)	(2,885)	4,556	(11,977)
Losses on foreign exchange	(3,568)	(1,299)	(4,649)	(1,418)
Other expense, net	(319)	(230)	(2,532)	(646)
Total other income (expense), net	$ 16,106	$ (3,017)	$ 32,363	$ (13,879)

NOTE 11. NET INCOME PER SHARE

Basic net income per share is computed by dividing net income during the period by the weighted average number of shares of common stock outstanding during that period, less unvested restricted stock awards. Diluted net income per share is impacted by equity instruments considered to be potential common shares, if dilutive, computed using the treasury stock method of accounting.

The calculations for basic and diluted net income per share for the three and nine months ended September 30, 2023 and October 1, 2022 are as follows:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
	(In thousands, except per share amounts)			
Net income	$ 254,321	$ 186,305	$ 717,245	$ 608,560
Weighted average common shares used to calculate basic net income per share	269,229	271,131	269,480	271,694
Stock-based awards	3,198	3,826	3,379	3,989
Weighted average common shares used to calculate diluted net income per share	272,427	274,957	272,859	275,683
Net income per share - basic	$ 0.94	$ 0.69	$ 2.66	$ 2.24
Net income per share - diluted	$ 0.93	$ 0.68	$ 2.63	$ 2.21

The following table presents shares of Cadence's common stock outstanding for the three and nine months ended September 30, 2023 and October 1, 2022 that were excluded from the computation of diluted net income per share because the effect of including these shares in the computation of diluted net income per share would have been anti-dilutive:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
	(In thousands)			
Long-term market-based awards	1,866	1,761	1,841	1,485
Options to purchase shares of common stock	262	514	373	678
Non-vested shares of restricted stock	807	26	288	63
Total potential common shares excluded	2,935	2,301	2,502	2,226

NOTE 12. INVESTMENTS

Marketable Equity Investments

Cadence's investments in marketable equity securities consist of purchased shares of publicly held companies and are included in prepaid expenses and other in Cadence's condensed consolidated balance sheets. Changes in the fair value of these investments are recorded to other income (expense), net in Cadence's condensed consolidated income statements. The carrying value of marketable equity investments was $58.4 million and $4.5 million as of September 30, 2023 and December 31, 2022, respectively.

Marketable Debt Securities

The following is a summary of Cadence's available-for-sale debt securities recorded within prepaid expenses and other on the condensed consolidated balance sheet as of September 30, 2023:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
	(In thousands)			
Available-for-sale securities				
Mortgage-backed and asset-backed securities	$ 44,042	$ 6	$ (1,421)	$ 42,627
Total available-for-sale securities	$ 44,042	$ 6	$ (1,421)	$ 42,627

Gross unrealized gains and losses are recorded as a component of accumulated other comprehensive loss on Cadence's condensed consolidated balance sheets.

As of September 30, 2023, the fair values of available-for-sale debt securities, by remaining contractual maturity, were as follows:

		(In thousands)
Due within 1 year	$	—
Due after 1 year through 5 years		8,366
Due after 5 years through 10 years		14,174
Due after 10 years		20,087
Total	$	42,627

As of September 30, 2023, Cadence does not intend to sell any of its available-for-sale securities in an unrealized loss position, and it is more likely than not that Cadence will hold the securities until maturity or a recovery of the cost basis.

Non-Marketable Equity Investments

Cadence's investments in non-marketable equity securities generally consist of stock or other instruments of privately held entities and are included in other assets on Cadence's condensed consolidated balance sheets. Cadence holds a 16% interest in a privately held company that is accounted for using the equity method of accounting. The carrying value of this investment was $112.6 million and $117.7 million as of September 30, 2023 and December 31, 2022, respectively.

Cadence records its proportionate share of net income from the investee, offset by amortization of basis differences, to other income (expense), net in Cadence's condensed consolidated income statements. For the three and nine months ended September 30, 2023, Cadence recognized losses of $1.0 million and $2.2 million, respectively. For the three and nine months ended October 1, 2022, Cadence recognized losses of $1.2 million and $2.5 million, respectively.

Cadence also holds other non-marketable investments in privately held companies where Cadence does not have the ability to exercise significant influence and the fair value of the investments is not readily determinable. The carrying value of these investments was $2.2 million and $2.3 million as of September 30, 2023 and December 31, 2022, respectively. Gains and losses on these investments were not material to Cadence's condensed consolidated financial statements for the periods presented.

NOTE 13. FAIR VALUE

Inputs to valuation techniques are observable or unobservable. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect Cadence's market assumptions. These two types of inputs have created the following fair value hierarchy:

- Level 1 – Quoted prices for identical instruments in active markets;
- Level 2 – Quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-derived valuations in which all significant inputs and significant value drivers are observable in active markets; and
- Level 3 – Valuations derived from valuation techniques in which one or more significant inputs or significant value drivers are unobservable.

This hierarchy requires Cadence to minimize the use of unobservable inputs and to use observable market data, if available, when determining fair value. Cadence recognizes transfers between levels of the hierarchy based on the fair values of the respective financial instruments at the end of the reporting period in which the transfer occurred. There were no transfers between levels of the fair value hierarchy during the nine months ended September 30, 2023.

On a quarterly basis, Cadence measures at fair value certain financial assets and liabilities. The fair value of financial assets and liabilities was determined using the following levels of inputs as of September 30, 2023 and December 31, 2022:

	Fair Value Measurements as of September 30, 2023			
	Total	Level 1	Level 2	Level 3
	(In thousands)			
Assets				
Cash equivalents:				
Money market funds	$ 444,303	$ 444,303	$ —	$ —
Marketable securities:				
Marketable equity securities	58,411	58,411	—	—
Mortgage-backed and asset-backed securities	42,627	—	42,627	—
Securities held in NQDC trust	67,324	67,324	—	—
Total Assets	$ 612,665	$ 570,038	$ 42,627	$ —

	Total	Level 1	Level 2	Level 3
	(In thousands)			
Liabilities				
Foreign currency exchange contracts	$ 10,102	$ —	$ 10,102	$ —
Total Liabilities	$ 10,102	$ —	$ 10,102	$ —

	Fair Value Measurements as of December 31, 2022			
	Total	Level 1	Level 2	Level 3
	(In thousands)			
Assets				
Cash equivalents:				
Money market funds	$ 548,373	$ 548,373	$ —	$ —
Marketable equity securities	4,490	4,490	—	—
Securities held in NQDC trust	55,605	55,605	—	—
Foreign currency exchange contracts	5,306	—	5,306	—
Total Assets	$ 613,774	$ 608,468	$ 5,306	$ —

As of December 31, 2022, Cadence did not have any financial liabilities requiring a recurring fair value measurement.

Level 1 Measurements

Cadence's cash equivalents held in money market funds, marketable equity securities and the trading securities held in Cadence's NQDC trust are measured at fair value using Level 1 inputs.

Level 2 Measurements

The valuation techniques used to determine the fair value of Cadence's investments in marketable debt securities, foreign currency forward exchange contracts and 2024 Notes are classified within Level 2 of the fair value hierarchy. For additional information relating to Cadence's debt arrangements, see Note 4 in the notes to condensed consolidated financial statements.

Level 3 Measurements

During the nine months ended September 30, 2023, Cadence acquired intangible assets of $38.4 million. The fair value of the intangible assets acquired was determined using variations of the income approach that utilizes unobservable inputs classified as Level 3 measurements.

For existing technology, the fair value was determined by applying the relief-from-royalty method. This method is based on the application of a royalty rate to forecasted revenue to quantify the benefit of owning the intangible asset rather than paying a royalty for use of the asset. To estimate royalty savings over time, Cadence projected revenue from the acquired existing technology over the estimated remaining life of the technology, including the effect of assumed technological obsolescence, before applying an assumed royalty rate. Cadence assumed technological obsolescence at rates between 10% and 13% annually, before applying an assumed royalty rate between 25% and 30%.

For agreements and relationships, the fair value was determined by using the multi-period excess earnings method. This method reflects the present value of the projected cash flows that are expected to be generated from existing customers, less charges representing the contribution of other assets to those cash flows. Projected income from existing customer relationships was determined using customer retention rates between 80% and 90%. The present value of operating cash flows from existing customers was determined using discount rates between 13.5% and 15%.

NOTE 14. INVENTORY

Cadence’s inventory balances as of September 30, 2023 and December 31, 2022 were as follows:

	As of	
	September 30, 2023	December 31, 2022
	(In thousands)	
Inventories:		
Raw materials	$ 154,097	$ 113,982
Finished goods	9,596	14,023
Total inventories	$ 163,693	$ 128,005

NOTE 15. COMMITMENTS AND CONTINGENCIES

Legal Proceedings

From time to time, Cadence is involved in various disputes and litigation that arise in the ordinary course of business. These include disputes and legal proceedings related to intellectual property, indemnification obligations, mergers and acquisitions, licensing, contracts, customers, products, distribution and other commercial arrangements and employee relations matters. At least quarterly, Cadence reviews the status of each significant matter and assesses its potential financial exposure. If the potential loss from any claim or legal proceeding is considered probable and the amount or the range of loss can be estimated, Cadence accrues a liability for the estimated loss. Legal proceedings are subject to uncertainties, and the outcomes are difficult to predict. Because of such uncertainties, accruals are based on Cadence’s judgments using the best information available at the time. As additional information becomes available, Cadence reassesses the potential liability related to pending claims and litigation matters and may revise estimates.

Tax Proceedings

In December 2022, Cadence received a tax audit assessment of approximately $49 million from the Korea taxing authorities for years 2017-2019. The tax audit assessment is primarily related to value-added taxes. Cadence is required to pay these assessed taxes, prior to being allowed to contest or litigate the assessment in administrative and judicial proceedings. The assessment was paid by Cadence in January 2023 and recorded as a component of other assets in the condensed consolidated balance sheets. Payment of this amount is not an admission that Cadence is subject to such taxes, and Cadence continues to defend its position vigorously. Cadence did not record a reserve for this contingency as of September 30, 2023 or December 31, 2022 as Cadence does not believe a loss is probable because it believes it will ultimately prevail in full. The entire dispute resolution process may take from one to eight years.

Other Contingencies

Cadence provides its customers with a warranty on sales of hardware products, generally for a 90-day period. Cadence did not incur any significant costs related to warranty obligations during the three and nine months ended September 30, 2023 and October 1, 2022.

Cadence’s product license and services agreements typically include a limited indemnification provision for claims from third parties relating to Cadence’s intellectual property. If the potential loss from any indemnification claim is considered probable and the amount or the range of loss can be estimated, Cadence accrues a liability for the estimated loss.

In connection with a litigation campaign launched in April 2022 by Bell Semiconductor LLC (“Bell Semi”), a patent monetization entity, some customers sought defense and indemnification against claims of patent infringement asserted by Bell Semi in various district court litigation and at the U.S. International Trade Commission. Bell Semi alleged that the customers’ use of one or more features of certain Cadence products infringed one or more of six patents held by Bell Semi. Cadence offered to defend some of its customers consistent with the terms of the applicable license agreements. On July 25, 2023, Cadence and Bell Semi reached a settlement agreement involving the six patents-in-suit. The settlement amount was not material to Cadence.

Cadence did not incur any material losses from indemnification claims during the three and nine months ended September 30, 2023 and October 1, 2022.

NOTE 16. ACCUMULATED OTHER COMPREHENSIVE LOSS

Cadence's accumulated other comprehensive loss is comprised of the aggregate impact of foreign currency translation gains and losses, changes in defined benefit plan liabilities and unrealized gains and losses on investments, and is presented in Cadence's condensed consolidated statements of comprehensive income.

Accumulated other comprehensive loss was comprised of the following as of September 30, 2023 and December 31, 2022:

	As of	
	September 30, 2023	December 31, 2022
	(In thousands)	
Foreign currency translation loss	$ (106,409)	$ (85,863)
Changes in defined benefit plan liabilities	(5,237)	(5,774)
Unrealized losses on investments	(1,415)	—
Total accumulated other comprehensive loss	$ (113,061)	$ (91,637)

For the three and nine months ended September 30, 2023 and October 1, 2022, there were no significant amounts related to foreign currency translation loss, changes in defined benefit plan liabilities or unrealized gains and losses on investments reclassified from accumulated other comprehensive loss to net income.

NOTE 17. SEGMENT REPORTING

Segment reporting is based on the "management approach," following the method that management organizes the company's reportable segments for which separate financial information is made available to, and evaluated regularly by, the chief operating decision maker in allocating resources and in assessing performance. Cadence's chief operating decision maker is its CEO, who reviews Cadence's consolidated results as one operating segment. In making operating decisions, the CEO primarily considers consolidated financial information, accompanied by disaggregated information about revenues by geographic region.

Outside the United States, Cadence markets and supports its products and services primarily through its subsidiaries. Revenue is attributed to geography based upon the country in which the product is used, or services are delivered. Long-lived assets are attributed to geography based on the country where the assets are located.

The following table presents a summary of revenue by geography for the three and nine months ended September 30, 2023 and October 1, 2022:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
	(In thousands)			
Americas:				
United States	$ 421,547	$ 392,222	$ 1,241,488	$ 1,174,734
Other Americas	15,800	15,165	47,884	39,010
Total Americas	437,347	407,387	1,289,372	1,213,744
Asia:				
China	172,022	148,325	523,694	401,460
Other Asia	197,831	156,250	558,687	466,891
Total Asia	369,853	304,575	1,082,381	868,351
Europe, Middle East and Africa	158,194	142,983	479,268	431,660
Japan	57,700	47,609	170,342	148,086
Total	$ 1,023,094	$ 902,554	$ 3,021,363	$ 2,661,841

The following table presents a summary of long-lived assets by geography as of September 30, 2023 and December 31, 2022:

	As of	
	September 30, 2023	December 31, 2022
	(In thousands)	
Americas:		
United States	$ 364,932	$ 347,822
Other Americas	10,169	7,548
Total Americas	375,101	355,370
Asia:		
China	41,386	51,667
Other Asia	70,743	73,329
Total Asia	112,129	124,996
Europe, Middle East and Africa	51,291	56,959
Japan	2,820	4,505
Total	$ 541,341	$ 541,830

NOTE 18. SUBSEQUENT EVENT

On October 2, 2023, Cadence acquired all of the outstanding equity of Intrinsix Corporation ("Intrinsix") from CEVA, Inc. The acquisition enhances Cadence's system and IC design services resources with the addition of a team with expertise in advanced nodes, radio frequency, mixed-signal and security algorithms. The acquisition also expands Cadence's reach in key high-growth verticals, including aerospace and defense. The aggregate cash consideration of approximately $35 million will be allocated to the assets acquired and liabilities assumed based on their estimated fair values on the acquisition date. Cadence expects to complete the initial accounting for its acquisition of Intrinsix during the fourth quarter of fiscal 2023.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion should be read in conjunction with the condensed consolidated financial statements and notes thereto included in this Quarterly Report on Form 10-Q (this "Quarterly Report") and in conjunction with our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 (our "Annual Report"). This Quarterly Report contains statements that are not historical in nature, are predictive, or that depend upon or refer to future events or conditions or contain other forward-looking statements. Statements including, but not limited to, statements regarding the extent, timing and mix of future revenues and customer demand; the deployment of our products and services; the impact of the macroeconomic and geopolitical environment, including but not limited to, the expanded trade control laws and regulations, the conflicts in and around Ukraine, the Middle East and other areas of the world, volatility in foreign currency exchange rates, inflation and the rise in interest rates; the impact of government actions; future costs, expenses, tax rates and uses of cash; pending legal, administrative and tax proceedings; restructuring actions and associated charges and benefits; the accounting for acquisitions and integration of acquired businesses; and other statements using words such as "anticipates," "believes," "could," "estimates," "expects," "forecasts," "intends," "may," "plans," "projects," "should," "targets," "will" and "would," and words of similar import and the negatives thereof, constitute forward-looking statements. These statements are predictions based upon our current expectations about future events. Actual results could vary materially as a result of certain factors, including, but not limited to, those expressed in these statements. We refer you to the "Results of Operations," "Quantitative and Qualitative Disclosures About Market Risk," and "Liquidity and Capital Resources" sections contained in this Quarterly Report, the "Risk Factors" section contained in our Annual Report and our subsequent Quarterly Reports on Form 10-Q, and the risks discussed in our other Securities and Exchange Commission ("SEC") filings, which identify important risks and uncertainties that could cause actual results to differ materially from those contained in the forward-looking statements.

We urge you to consider these factors carefully in evaluating the forward-looking statements contained in this Quarterly Report. All subsequent written or oral forward-looking statements attributable to our company or persons acting on our behalf are expressly qualified in their entirety by these cautionary statements. The forward-looking statements included in this Quarterly Report are made only as of the date of this Quarterly Report. We disclaim any obligation to update these forward-looking statements, except as required by law.

Business Overview

Cadence is a leader in electronic system design, building upon more than 30 years of computational software expertise. We apply our underlying Intelligent System Design strategy to deliver computational software, hardware and intellectual property ("IP") that turn design concepts into reality. We enable our customers to develop electronic products. Our products and services are designed to give our customers a competitive edge in their development of integrated circuits ("ICs"), systems-on-chip ("SoCs"), and increasingly sophisticated electronic devices and systems. Our products and services do this by optimizing performance, minimizing power consumption, shortening the time to bring our customers' products to market, improving engineering productivity and reducing their design, development and manufacturing costs.

Our strategy is to provide the technology necessary for our customers to develop products across a variety of vertical markets including consumer, hyperscale computing, mobile, 5G communications, automotive, aerospace and defense, industrial, healthcare and life sciences. Our products and services enable our customers to develop complex and innovative electronic products, so demand for our technology is driven by our customers' investment in new designs and products. Historically, the industry that provided the tools used by IC engineers was referred to as Electronic Design Automation ("EDA"). Today, our offerings include and extend beyond EDA.

We group our products into categories related to major design activities:

- Custom IC Design and Simulation;
- Digital IC Design and Signoff;
- Functional Verification;
- IP; and
- System Design and Analysis.

For additional information about our products, see the discussion in Item 1, "Business," under the heading "Products and Product Categories," in our Annual Report.

Management uses certain performance indicators to manage our business, including revenue, certain elements of operating expenses and cash flow from operations, and we describe these items further below under the headings "Results of Operations" and "Liquidity and Capital Resources."

Fiscal Year End

In fiscal 2022, our Board of Directors approved a change in our fiscal year end from the Saturday closest to December 31 of each year to December 31 of each year. The fiscal year change became effective beginning with our 2023 fiscal year, which began on January 1, 2023. Our fiscal quarters now end on March 31, June 30, and September 30.

Macroeconomic and Geopolitical Environment

Because we operate globally, our business is subject to the effects of expanded trade control laws and regulations, geopolitical conflict in and around Ukraine, Israel and other areas of the world, volatility in foreign currency exchange rates relative to the United States ("U.S.") dollar and the rise in interest rates.

We have been impacted by the continued expansion of trade control laws and regulations, that include certain export control restrictions concerning advanced node IC production in China, the inclusion of additional Chinese technology companies on the Bureau of Industry and Security ("BIS") "Entity List" and regulations governing the sale of certain technologies. Based on our current assessments, we expect the impact of these expanded trade control laws and regulations on our business to be limited.

We also continuously monitor geopolitical conflicts around the world and their effects on our business. During the first half of fiscal 2022, due to the ongoing conflict between Russia and Ukraine and the corresponding sanctions imposed by the United States and other countries, we terminated our operations in Russia. The termination of our operations in Russia has not limited our ability to develop or support our products and has not had a material impact on our results of operations, financial condition, liquidity or cash flows. We do not have operations or employees in Ukraine.

More recently, the conflict in the Middle East has had an impact on our employees and our customers in that region of the world. It is too early to determine the full extent of the impact this conflict could have on our business and our operations, and our assessment of the potential impacts is ongoing.

While our business model provides some resilience against these factors, we will continue to monitor the direct and indirect impacts of these or similar circumstances on our business and financial results. For additional information on the potential impact of other macroeconomic and geopolitical conditions on our business, see the "Risk Factors" sections in our Annual Report and our Quarterly Report on Form 10-Q for the quarter ended March 31, 2023 (the "Q1 Report"). For additional information on the potential impact of foreign currency exchange rates and interest rates on our business, see the "Quantitative and Qualitative Disclosures About Market Risk" section of this Quarterly Report.

Critical Accounting Estimates

In preparing our condensed consolidated financial statements, we make assumptions, judgments and estimates that can have a significant impact on our revenue, operating income and net income, as well as on the value of certain assets and liabilities on our condensed consolidated balance sheets. We base our assumptions, judgments and estimates on historical experience and various other factors that we believe to be reasonable under the circumstances. Actual results could differ materially from these estimates under different assumptions or conditions. At least quarterly, we evaluate our assumptions, judgments and estimates, and make changes as deemed necessary.

For additional information about our critical accounting estimates, see the discussion in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," under the heading "Critical Accounting Estimates" in our Annual Report.

New Accounting Standards

For additional information about the adoption of new accounting standards, see Note 1 in the notes to condensed consolidated financial statements.

Results of Operations

Financial results for the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, reflect the following:

- Growth in revenue from our software and emulation and prototyping hardware offerings;
- Continued investment in research and development activities and technical sales support; and
- Restructuring activities designed to better align our resources with our business strategy.

Revenue

We primarily generate revenue from licensing our software and IP, selling or leasing our emulation and prototyping hardware technology, providing maintenance for our software, hardware and IP, providing engineering services and earning royalties generated from the use of our IP. The timing of our revenue is significantly affected by the mix of software, hardware and IP products generating revenue in any given period and whether the revenue is recognized over time or at a point in time, upon completion of delivery.

Approximately 85% of our annual revenue is characterized as recurring revenue. Recurring revenue includes revenue recognized over time from our software arrangements, services, royalties, maintenance on IP licenses and hardware, and operating leases of hardware. Recurring revenue also includes revenue recognized at varying points in time over the term of other arrangements with non-cancelable commitments, whereby the customer commits to a fixed dollar amount over a specified period of time that can be used to purchase from a list of products or services.

The remainder of our revenue is recognized at a point in time and is characterized as up-front revenue. Up-front revenue is primarily generated by our sales of emulation and prototyping hardware and individual IP licenses. The percentage of our recurring and up-front revenue and fluctuations in revenue within our geographies are impacted by delivery of hardware and IP products to our customers in any single fiscal period.

The following table shows the percentage of our revenue that is classified as recurring or up-front for the three and nine months ended September 30, 2023 and October 1, 2022:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
Revenue recognized over time	83 %	81 %	80 %	82 %
Revenue from arrangements with non-cancelable commitments	2 %	3 %	3 %	2 %
Recurring revenue	85 %	84 %	83 %	84 %
Up-front revenue	15 %	16 %	17 %	16 %
Total	100 %	100 %	100 %	100 %

While the percentage of revenue characterized as recurring compared to revenue characterized as up-front may vary between fiscal quarters, the overall mix of revenue is relatively consistent on an annual basis or over the course of twelve consecutive months. The following table shows the percentage of recurring revenue for the twelve-month periods ending concurrently with our five most recent fiscal quarters:

	Trailing Twelve Months Ended				
	September 30, 2023	June 30, 2023	March 31, 2023	December 31, 2022	October 1, 2022
Recurring revenue	84 %	84 %	84 %	85 %	86 %
Up-front revenue	16 %	16 %	16 %	15 %	14 %
Total	100 %	100 %	100 %	100 %	100 %

Revenue by Period

The following table shows our revenue for the three months ended September 30, 2023 and October 1, 2022 and the change in revenue between periods:

	Three Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance	$ 965.8	$ 845.8	$ 120.0	14 %
Services	57.3	56.8	0.5	1 %
Total revenue	$ 1,023.1	$ 902.6	$ 120.5	13 %

The following table shows our revenue for the nine months ended September 30, 2023 and October 1, 2022 and the change in revenue between periods:

	Nine Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance	$ 2,852.4	$ 2,494.3	$ 358.1	14 %
Services	169.0	167.5	1.5	1 %
Total revenue	$ 3,021.4	$ 2,661.8	$ 359.6	14 %

Product and maintenance revenue growth during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, was primarily due to our customers continuing to invest in new, complex designs for their products that include the design of electronic systems for consumer, hyperscale computing, mobile, 5G communications, automotive, aerospace and defense, industrial and healthcare.

Services revenue may fluctuate from period to period based on the timing of fulfillment of our services and IP performance obligations.

No single customer accounted for 10% or more of total revenue during the three and nine months ended September 30, 2023 or October 1, 2022.

Revenue by Product Category

The following table shows the percentage of revenue contributed by each of our five product categories and services for the past five consecutive quarters:

	Three Months Ended				
	September 30, 2023	June 30, 2023	March 31, 2023	December 31, 2022	October 1, 2022
Custom IC Design and Simulation	22 %	22 %	20 %	22 %	22 %
Digital IC Design and Signoff	28 %	27 %	25 %	28 %	29 %
Functional Verification, including Emulation and Prototyping Hardware	26 %	27 %	32 %	25 %	25 %
IP	11 %	11 %	11 %	12 %	12 %
System Design and Analysis	13 %	13 %	12 %	13 %	12 %
Total	100 %	100 %	100 %	100 %	100 %

Revenue by product category fluctuates from period to period based on demand for our products and services, our available resources and our ability to deliver and support them. For example, during the first quarter of fiscal 2023, we experienced growth in our Functional Verification product category due to increased production capacity and our ability to fulfill ongoing customer demand for our emulation and prototyping hardware. Certain of our licensing arrangements allow customers the ability to remix among software products. Additionally, we have arrangements with customers that include a combination of our products, with the actual product selection and number of licensed users to be determined at a later date. For these arrangements, we estimate the allocation of the revenue to product categories based upon the expected usage of our products. The actual usage of our products by these customers may differ and, if that proves to be the case, the revenue allocation in the table above would differ.

Revenue by Geography

	Three Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
United States	$ 421.6	$ 392.2	$ 29.4	7 %
Other Americas	15.8	15.2	0.6	4 %
China	172.0	148.3	23.7	16 %
Other Asia	197.8	156.3	41.5	27 %
Europe, Middle East and Africa (“EMEA”)	158.2	143.0	15.2	11 %
Japan	57.7	47.6	10.1	21 %
Total revenue	$ 1,023.1	$ 902.6	$ 120.5	13 %

	Nine Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
United States	$ 1,241.5	$ 1,174.7	$ 66.8	6 %
Other Americas	47.9	39.0	8.9	23 %
China	523.7	401.5	122.2	30 %
Other Asia	558.7	466.9	91.8	20 %
EMEA	479.3	431.6	47.7	11 %
Japan	170.3	148.1	22.2	15 %
Total revenue	$ 3,021.4	$ 2,661.8	$ 359.6	14 %

During the three months ended September 30, 2023, as compared to the three months ended October 1, 2022, revenue growth in each of our six geographies was primarily driven by increased revenue from our software offerings, resulting from our customers’ continued investment in new, complex designs for their products. Also, during the three months ended September 30, 2023, as compared to the three months ended October 1, 2022, revenue growth from our emulation and prototyping hardware offerings contributed to the growth experienced in the United States, China, Other Asia and Japan.

During the nine months ended September 30, 2023, as compared to the nine months ended October 1, 2022, revenue growth in the United States, Other Americas, Other Asia, EMEA and Japan was primarily driven by increased revenue from our software offerings. Revenue growth in China during the nine months ended September 30, 2023, as compared to the nine months ended October 1, 2022, was primarily due to increased revenue from our emulation and prototyping hardware offerings. This growth was driven by increased production capacity to address continued demand from our customers in China for our emulation and prototyping hardware offerings.

Revenue by Geography as a Percent of Total Revenue

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
United States	41 %	43 %	41 %	44 %
Other Americas	2 %	2 %	2 %	1 %
China	17 %	17 %	17 %	15 %
Other Asia	19 %	17 %	18 %	18 %
EMEA	15 %	16 %	16 %	16 %
Japan	6 %	5 %	6 %	6 %
Total	100 %	100 %	100 %	100 %

Most of our revenue is transacted in the U.S. dollar. However, certain revenue transactions are denominated in foreign currencies. For an additional description of how changes in foreign exchange rates affect our condensed consolidated financial statements, see the discussion under Item 3, "Quantitative and Qualitative Disclosures About Market Risk – Foreign Currency Risk."

Cost of Revenue

The following tables show our cost of revenue for the three and nine months ended September 30, 2023 and October 1, 2022 and the change in cost of revenue between periods:

	Three Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Cost of product and maintenance	$ 85.8	$ 62.4	$ 23.4	38 %
Cost of services	23.8	25.2	(1.4)	(6) %

	Nine Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Cost of product and maintenance	$ 260.3	$ 203.9	$ 56.4	28 %
Cost of services	70.6	74.2	(3.6)	(5) %

Cost of Product and Maintenance

Cost of product and maintenance includes costs associated with the sale and lease of our emulation and prototyping hardware and licensing of our software and IP products, certain employee salary and benefits and other employee-related costs, cost of our customer support services, amortization of technology-related and maintenance-related acquired intangibles, costs of technical documentation and royalties payable to third-party vendors. Cost of product and maintenance depends primarily on our hardware product sales in any given period, but is also affected by employee salary and benefits and other employee-related costs, reserves for inventory, and the timing and extent to which we acquire intangible assets, license third-party technology or IP, and sell our products that include such acquired or licensed technology or IP.

A summary of cost of product and maintenance is as follows:

	Three Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance-related costs	$ 74.8	$ 53.5	$ 21.3	40 %
Amortization of acquired intangibles	11.0	8.9	2.1	24 %
Total cost of product and maintenance	$ 85.8	$ 62.4	$ 23.4	38 %

	Nine Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance-related costs	$ 228.4	$ 173.0	$ 55.4	32 %
Amortization of acquired intangibles	31.9	30.9	1.0	3 %
Total cost of product and maintenance	$ 260.3	$ 203.9	$ 56.4	28 %

The changes in product and maintenance-related costs for the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, were due to the following:

	Change	
	Three Months Ended	Nine Months Ended
	(In millions)	
Emulation and prototyping hardware costs	$ 20.1	$ 47.8
Salary, benefits and other employee-related costs	1.0	5.5
Other items	0.2	2.1
Total change in product and maintenance-related costs	$ 21.3	$ 55.4

Costs associated with our emulation and prototyping hardware products include components, assembly, testing, applicable reserves and overhead. These costs make our cost of emulation and prototyping hardware products higher, as a percentage of revenue, than our cost of software and IP products. Emulation and prototyping hardware costs increased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to increased revenue from emulation and prototyping hardware products.

Amortization of acquired intangibles included in cost of product and maintenance may fluctuate from period to period depending on the timing of newly acquired assets relative to assets becoming fully amortized in any given period.

Cost of Services

Cost of services primarily includes employee salary, benefits and other employee-related costs to perform work on revenue-generating projects and costs to maintain the infrastructure necessary to manage a services organization. Cost of services may fluctuate from period to period based on our utilization of design services engineers on revenue-generating projects rather than internal development projects.

Operating Expenses

Our operating expenses include marketing and sales, research and development, and general and administrative expenses. Factors that tend to cause our operating expenses to fluctuate include changes in the number of employees due to hiring and acquisitions, our annual mid-year promotion and pay raise cycle, stock-based compensation, foreign exchange rate movements, acquisition-related costs, volatility in variable compensation programs that are driven by operating results, and charitable donations.

Many of our operating expenses are transacted in various foreign currencies. We recognize lower expenses in periods when the United States dollar strengthens in value against other currencies and we recognize higher expenses when the United States dollar weakens against other currencies. For an additional description of how changes in foreign exchange rates affect our condensed consolidated financial statements, see the discussion in Item 3, “Quantitative and Qualitative Disclosures About Market Risk – Foreign Currency Risk.”

Our operating expenses for the three and nine months ended September 30, 2023 and October 1, 2022 were as follows:

	Three Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Marketing and sales	$ 176.2	$ 152.9	$ 23.3	15 %
Research and development	369.6	323.6	46.0	14 %
General and administrative	58.6	73.7	(15.1)	(20) %
Total operating expenses	$ 604.4	$ 550.2	$ 54.2	10 %

	Nine Months Ended		Change	
	September 30, 2023	October 1, 2022	Amount	Percentage
	(In millions, except percentages)			
Marketing and sales	$ 510.0	$ 432.4	$ 77.6	18 %
Research and development	1,074.4	901.1	173.3	19 %
General and administrative	166.7	174.1	(7.4)	(4) %
Total operating expenses	$ 1,751.1	$ 1,507.6	$ 243.5	16 %

Our operating expenses, as a percentage of total revenue, for the three and nine months ended September 30, 2023 and October 1, 2022 were as follows:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
Marketing and sales	17 %	17 %	17 %	16 %
Research and development	36 %	36 %	35 %	34 %
General and administrative	6 %	8 %	6 %	7 %
Total operating expenses	59 %	61 %	58 %	57 %

Marketing and Sales

The increase in marketing and sales expense for the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, was due to the following:

	Change	
	Three Months Ended	Nine Months Ended
	(In millions)	
Salary, benefits and other employee-related costs	$ 15.2	$ 45.5
Marketing programs and events	0.4	9.6
Stock-based compensation	3.1	9.2
Facilities and other infrastructure costs	2.3	6.9
Travel and sales meetings	1.2	5.7
Other items	1.1	0.7
Total change in marketing and sales expense	$ 23.3	$ 77.6

Salary, benefits and other employee-related costs and stock-based compensation included in marketing and sales expense increased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to our continued investment in attracting and retaining talent dedicated to technical sales support, including additional headcount from the acquisitions completed in both fiscal 2022 and fiscal 2023. Costs related to marketing programs and events, travel and sales meetings increased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to an increased number of in-person meetings and events. We expect to continue attracting and retaining talent dedicated to technical sales support through hiring and acquisitions.

Research and Development

The increase in research and development expense for the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, was due to the following:

	Change	
	Three Months Ended	Nine Months Ended
	(In millions)	
Salary, benefits and other employee-related costs	$ 26.6	$ 119.4
Stock-based compensation	9.7	26.6
Facilities and other infrastructure costs	4.6	14.3
Professional services	2.2	5.1
Materials and other pre-production costs	2.1	4.5
Travel	0.6	4.0
Other items	0.2	(0.6)
Total change in research and development expense	$ 46.0	$ 173.3

Salary, benefits and other employee-related costs and stock-based compensation included in research and development expense increased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to our continued investment in attracting and retaining talent for research and development activities, including additional headcount from the acquisitions completed in both fiscal 2022 and fiscal 2023. Facilities and other infrastructure costs included in research and development expense increased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to our growing workforce. We expect to continue attracting and retaining talent dedicated to research and development activities through hiring and acquisitions.

General and Administrative

The decrease in general and administrative expense for the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, was due to the following:

	Change	
	Three Months Ended	Nine Months Ended
	(In millions)	
Salary, benefits and other employee-related costs	$ 3.2	$ 15.9
Stock-based compensation	1.5	4.7
Foreign service tax	4.0	4.1
Professional services	1.8	(4.6)
Contributions to non-profit organizations	(25.0)	(29.0)
Other items	(0.6)	1.5
Total change in general and administrative expense	$ (15.1)	$ (7.4)

Salary, benefits and other employee-related costs and stock-based compensation included in general and administrative expense increased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to additional headcount. Also during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, we experienced an increase in foreign service tax, primarily because we did not benefit from any foreign service tax refunds like we did during the same period in fiscal 2022.

During the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, contributions to non-profit organizations decreased, primarily due to the timing of our periodic contributions to support charitable initiatives, including the Cadence Giving Foundation.

Restructuring

In August 2023, we initiated a restructuring plan (the “2023 Restructuring Plan”) designed to better align our resources with our business strategy. During the three and nine months ended September 30, 2023, we incurred $11.6 million of costs comprised of severance and other termination benefits related to headcount reductions. These costs are included in restructuring in our condensed consolidated income statements.

Inclusive of the 2023 Restructuring Plan, we are evaluating certain facilities for closure. Restructuring charges for the facilities under consideration are not expected to exceed $5 million. Restructuring costs related to facility closures will be primarily comprised of accelerated Right-of-Use ("ROU") asset amortization, interest accretion on lease liabilities after the facility is vacated, lease buyout costs and certain contractual costs to maintain facilities during the period after abandonment. We record accelerated ROU asset amortization over the period beginning from when the decision is made to abandon the facility until the facility is fully vacated and we have no intention to further utilize the leased space. Other facilities-related restructuring charges are generally recorded in the period in which the affected facilities are vacated.

Because the restructuring charges and related benefits are derived from management's estimates made during the formulation of the restructuring plans, based on then-currently available information, our restructuring plans may not achieve the benefits anticipated on the timetable or at the level contemplated. Additional actions, including further restructuring of our operations, may be required in the future.

Operating Margin

Operating margin represents income from operations as a percentage of total revenue. Our operating margin for the three and nine months ended September 30, 2023, and the three and nine months ended October 1, 2022 was as follows:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
Operating margin	29 %	29 %	30 %	32 %

Operating margin decreased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to the mix of products and services sold during each respective period. In addition, our fiscal 2022 acquisitions resulted in incremental expenses, including acquisition of acquired intangibles, that exceeded incremental revenue during the three and nine months ended September 30, 2023.

Interest Expense

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
		(In millions)		
Contractual cash interest expense:				
2024 Notes	3.8	3.8	$ 11.4	$ 11.4
2025 Term Loan	4.6	0.9	13.0	0.9
Revolving credit facility	0.2	0.7	1.9	1.1
Amortization of debt discount:				
2024 Notes	0.3	0.2	0.7	0.6
2025 Term Loan	0.1	—	0.2	—
Other	0.1	(0.1)	—	(0.1)
Total interest expense	$ 9.1	$ 5.5	$ 27.2	$ 13.9

Interest expense increased during the three and nine months ended September 30, 2023, as compared to the three and nine months ended October 1, 2022, primarily due to borrowings under our 2025 Term Loan, which are subject to variable interest rates. For additional information relating to our debt arrangements, see Note 4 in the notes to condensed consolidated financial statements.

Income Taxes

The following table presents the provision for income taxes and the effective tax rate for the three and nine months ended September 30, 2023 and October 1, 2022:

	Three Months Ended		Nine Months Ended	
	September 30, 2023	October 1, 2022	September 30, 2023	October 1, 2022
			(In millions, except percentages)	
Provision for income taxes	$ 45.6	$ 66.0	$ 202.6	$ 226.3
Effective tax rate	15.2 %	26.1 %	22.0 %	27.1 %

Our provision for income taxes for the three and nine months ended September 30, 2023 was primarily attributable to federal, state and foreign income taxes on our anticipated fiscal 2023 income. We also recognized tax benefits of $21.0 million and $46.8 million related to stock-based compensation that vested or was exercised during each period.

Our provision for income taxes for the three and nine months ended October 1, 2022 was primarily attributable to federal, state and foreign income taxes on our then anticipated fiscal 2022 income. We also recognized a tax benefit of $18.0 million and $36.9 million related to stock-based compensation that vested or was exercised during each period.

Our future effective tax rates may also be materially impacted by tax amounts associated with our foreign earnings at rates different from the United States federal statutory rate, research credits, the tax impact of stock-based compensation, accounting for uncertain tax positions, business combinations, closure of statutes of limitations or settlement of tax audits and changes in tax law. A significant amount of our foreign earnings is generated by our subsidiaries organized in Ireland and Hungary. Our future effective tax rates may be adversely affected if our earnings were to be lower in countries where we have lower statutory tax rates. We currently expect that our fiscal 2023 effective tax rate will be approximately 23%. We expect that our quarterly effective tax rates will vary from our fiscal 2023 effective tax rate as a result of recognizing the income tax effects of stock-based awards in the quarterly periods that the awards vest or are settled and other items that we cannot anticipate. For additional discussion about how our effective tax rate could be affected by various risks, see Part I, Item 1A, "Risk Factors," in our Annual Report.

Liquidity and Capital Resources

	As of		
	September 30, 2023	December 31, 2022	Change
	(In millions)		
Cash and cash equivalents	$ 962.0	$ 882.3	$ 79.7
Net working capital	560.3	359.1	201.2

Cash and Cash Equivalents

As of September 30, 2023, our principal sources of liquidity consisted of approximately $962.0 million of cash and cash equivalents as compared to $882.3 million as of December 31, 2022.

Our primary sources of cash and cash equivalents during the nine months ended September 30, 2023 were cash generated from operations, proceeds from the issuance of common stock resulting from stock purchases under our employee stock purchase plan and stock options exercised during the period, proceeds from the sale of investments, and proceeds from our revolving credit facility.

Our primary uses of cash and cash equivalents during the nine months ended September 30, 2023 were payments related to employee salaries and benefits, operating expenses, repurchases of our common stock, cash paid for acquired businesses, payments on our revolving credit facility, purchases of investments, payment of employee taxes on vesting of restricted stock, and purchases of property, plant and equipment.

Approximately 66% of our cash and cash equivalents were held by our foreign subsidiaries as of September 30, 2023. Our cash and cash equivalents held by our foreign subsidiaries may vary from period to period due to the timing of collections and repatriation of foreign earnings. We expect that current cash and cash equivalent balances and cash flows that are generated from operations and financing activities will be sufficient to meet the needs of our domestic and international operating activities and other capital and liquidity requirements, including acquisitions, investments and share repurchases, for at least the next 12 months and thereafter for the foreseeable future.

Net Working Capital

Net working capital is comprised of current assets less current liabilities, as shown on our condensed consolidated balance sheets. The increase in our net working capital as of September 30, 2023, as compared to December 31, 2022, is primarily due to the timing of cash receipts from customers and disbursements made for operating and financing activities.

Cash Flows from Operating Activities

	Nine Months Ended		
	September 30, 2023	October 1, 2022	Change
	(In millions)		
Cash provided by operating activities	$ 1,077.1	$ 978.3	$ 98.8

Cash flows from operating activities include net income, adjusted for certain non-cash items, as well as changes in the balances of certain assets and liabilities. Our cash flows provided by operating activities are significantly influenced by business levels and the payment terms set forth in our customer agreements. The increase in cash flows from operating activities for the nine months ended September 30, 2023, as compared to the nine months ended October 1, 2022, was primarily due to improved results from operations and the timing of cash receipts from customers and the timing of cash disbursements, including cash used for interest and taxes.

Cash Flows Used for Investing Activities

	Nine Months Ended		
	September 30, 2023	October 1, 2022	Change
	(In millions)		
Cash used for investing activities	$ (313.6)	$ (674.5)	$ 360.9

Cash used for investing activities decreased during the nine months ended September 30, 2023, as compared to the nine months ended October 1, 2022, primarily due to decreases in cash used for business combinations, partially offset by increases in cash used for purchases of equity and debt securities. We expect to continue our investing activities, including purchasing property, plant and equipment, purchasing intangible assets, acquiring other companies and businesses, and making investments.

Cash Flows Used for Financing Activities

	Nine Months Ended		
	September 30, 2023	October 1, 2022	Change
	(In millions)		
Cash used for financing activities	$ (666.0)	$ (299.9)	$ (366.1)

Cash used for financing activities increased during the nine months ended September 30, 2023, as compared to the nine months ended October 1, 2022, primarily due to a decrease in proceeds from debt, partially offset by a decrease in payments for repurchases of our common stock.

Other Factors Affecting Liquidity and Capital Resources

Stock Repurchase Program

In August 2023, our Board of Directors increased the prior authorization to repurchase shares of our common stock by authorizing an additional $1.0 billion. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors. As of September 30, 2023, approximately $1.5 billion of the share repurchase authorization remained available to repurchase shares of our common stock. See Part II, Item 2, “Unregistered Sales of Equity Securities and Use of Proceeds” for additional information on share repurchases.

Revolving Credit Facility

In June 2021, we entered into a five-year senior unsecured revolving credit facility with a group of lenders led by Bank of America, N.A., as administrative agent, as amended in September 2022 (the “2021 Credit Facility”). The 2021 Credit Facility provides for borrowings up to $700.0 million, with the right to request increased capacity up to an additional $350.0 million upon receipt of lender commitments, for total maximum borrowings of $1.05 billion. The 2021 Credit Facility expires on June 30, 2026. Any outstanding loans drawn under the 2021 Credit Facility are due at maturity on June 30, 2026, subject to an option to extend the maturity date. Outstanding borrowings may be repaid at any time prior to maturity. Interest rates associated with the 2021 Credit Facility are variable, so interest expense is impacted by changes in the interest rates, particularly for periods when there are outstanding borrowings under the revolving credit facility. Interest is payable quarterly. As of September 30, 2023, there were no borrowings outstanding under the 2021 Credit Facility, and we were in compliance with all financial covenants associated with such credit facility.

2024 Notes

In October 2014, we issued a $350.0 million aggregate principal amount of 4.375% Senior Notes due October 15, 2024 (the “2024 Notes”). We received net proceeds of $342.4 million from the issuance of the 2024 Notes, net of a discount of $1.4 million and issuance costs of $6.2 million. Interest is payable in cash semi-annually. The 2024 Notes are unsecured and rank equal in right of payment to all of our existing and future senior indebtedness. As of September 30, 2023, we were in compliance with all covenants associated with the 2024 Notes.

2025 Term Loan

In September 2022, we entered into a $300.0 million three-year senior non-amortizing term loan facility due on September 7, 2025 with a group of lenders led by Bank of America, N.A., as administrative agent (the “2025 Term Loan”). The 2025 Term Loan is unsecured and ranks equal in right of payment to all of our unsecured indebtedness. Interest rates associated with the 2025 Term Loan are variable, so interest expense is impacted by changes in interest rates. Interest is payable quarterly. As of September 30, 2023, we were in compliance with all financial covenants associated with the 2025 Term Loan.

For additional information relating to our debt arrangements, see Note 4 in the notes to condensed consolidated financial statements.

Other Liquidity Requirements

During the nine months ended September 30, 2023, there were no material changes to our other liquidity requirements as reported in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” in our Annual Report.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

Foreign Currency Risk

A material portion of our revenue, expenses and business activities are transacted in the U.S. dollar. In certain foreign countries where we price our products and services in U.S. dollars, a decrease in value of the local currency relative to the U.S. dollar results in an increase in the prices for our products and services compared to those products of our competitors that are priced in local currency. This could result in our prices being uncompetitive in certain markets.

In certain countries where we may invoice customers in the local currency, our revenue benefits from a weaker dollar and is adversely affected by a stronger dollar. The opposite impact occurs in countries where we record expenses in local currencies. In those cases, our costs and expenses benefit from a stronger dollar and are adversely affected by a weaker dollar. The fluctuations in our operating expenses outside the United States resulting from volatility in foreign exchange rates are not generally moderated by corresponding fluctuations in revenue from existing contracts.

We enter into foreign currency forward exchange contracts to protect against currency exchange risks associated with existing assets and liabilities. A foreign currency forward exchange contract acts as a hedge by increasing in value when underlying assets decrease in value or underlying liabilities increase in value due to changes in foreign exchange rates. Conversely, a foreign currency forward exchange contract decreases in value when underlying assets increase in value or underlying liabilities decrease in value due to changes in foreign exchange rates. These forward contracts are not designated as accounting hedges, so the unrealized gains and losses are recognized in other income (expense), net, in advance of the actual foreign currency cash flows with the fair value of these forward contracts being recorded as accrued liabilities or other current assets.

We do not use forward contracts for trading purposes. Our forward contracts generally have maturities of 90 days or less. We enter into foreign currency forward exchange contracts based on estimated future asset and liability exposures, and the effectiveness of our hedging program depends on our ability to estimate these future asset and liability exposures. Recognized gains and losses with respect to our current hedging activities will ultimately depend on how accurately we are able to match the amount of foreign currency forward exchange contracts with actual underlying asset and liability exposures.

The following table provides information about our foreign currency forward exchange contracts as of September 30, 2023. The information is provided in U.S. dollar equivalent amounts. The table presents the notional amounts, at contract exchange rates, and the weighted average contractual foreign currency exchange rates expressed as units of the foreign currency per U.S. dollar, which in some cases may not be the market convention for quoting a particular currency. All of these forward contracts mature before or during November 2023.

	Notional Principal	Weighted Average Contract Rate
	(In millions)	
Forward Contracts:		
European Union euro	$ 173.9	0.91
Japanese yen	87.5	143.68
British pound	67.3	0.79
Israeli shekel	59.6	3.73
South Korean won	41.0	1308
Canadian dollar	31.7	1.34
Indian rupee	29.0	83.09
Swedish krona	22.9	10.78
Chinese renminbi	17.8	7.25
Taiwan dollar	11.8	31.85
Other	4.3	N/A
Total	$ 546.8	
Estimated fair value	$ 10.1	

As of December 31, 2022, our foreign currency exchange contracts had an aggregate principal amount of $489.0 million, and an estimated fair value of $5.3 million.

We have performed sensitivity analyses as of September 30, 2023 and December 31, 2022, using a modeling technique that measures the change in the fair values arising from a hypothetical 10% change in the value of the U.S. dollar relative to applicable foreign currency exchange rates, with all other variables held constant. The foreign currency exchange rates we used in performing the sensitivity analysis were based on market rates in effect at each respective date. The sensitivity analyses indicated that a hypothetical 10% decrease in the value of the U.S. dollar would result in a decrease to the fair value of our foreign currency forward exchange contracts of $3.9 million and $4.2 million as of September 30, 2023 and December 31, 2022, respectively, while a hypothetical 10% increase in the value of the U.S. dollar would result in an increase to the fair value of our foreign currency forward exchange contracts of $6.3 million and $7.2 million as of September 30, 2023 and December 31, 2022, respectively.

We actively monitor our foreign currency risks, but our foreign currency hedging activities may not substantially offset the impact of fluctuations in currency exchange rates on our results of operations, cash flows and financial position.

Interest Rate Risk

Our exposure to market risk for changes in interest rates relates primarily to our portfolio of cash, cash equivalents, investments in debt securities and any balances outstanding on our 2021 Credit Facility and 2025 Term Loan. We are exposed to interest rate fluctuations in many of the world's leading industrialized countries, but our interest income and expense is most sensitive to fluctuations in the general level of United States interest rates. In this regard, changes in United States interest rates affect the interest earned on our cash and cash equivalents and the costs associated with foreign currency hedges. All highly liquid securities with a maturity of three months or less at the date of purchase are considered to be cash equivalents. The carrying value of our interest-bearing instruments approximated fair value as of September 30, 2023.

Our investments in debt securities had a fair value of approximately $42.6 million as of September 30, 2023, that may decline in value if market interest rates rise. Such variability in market interest rates may result in a negative impact on the results of our investment activities. As of September 30, 2023, an increase in the market rates of interest of 1% would result in a decrease in the fair values of our marketable debt securities by approximately $2.3 million. As of December 31, 2022, we did not hold investments in debt securities.

Interest rates under our 2021 Credit Facility and 2025 Term Loan are variable, so interest expense could be adversely affected by changes in interest rates, particularly for periods when we maintain a balance outstanding under the revolving credit facility. As of September 30, 2023, there were no borrowings outstanding under our 2021 Credit Facility and $300.0 million of borrowings outstanding under our 2025 Term Loan.

Interest rates for our 2021 Credit Facility and 2025 Term Loan can fluctuate based on changes in market interest rates and in interest rate margins that vary based on the credit ratings of our unsecured debt. Assuming all loans were fully drawn and we were to fully exercise our right to increase borrowing capacity under our 2021 Credit Facility and made no prepayments on our 2025 Term Loan, each quarter point change in interest rates would result in a $3.4 million change in annual interest expense on our indebtedness under our 2021 Credit Facility and 2025 Term Loan. For an additional description of the 2021 Credit Facility and 2025 Term Loan, see Note 4 in the notes to condensed consolidated financial statements.

Equity Price Risk

Equity Investments

We have a portfolio of equity investments that includes marketable equity securities and non-marketable investments. Our equity investments are made primarily in connection with our strategic investment program. Under our strategic investment program, from time to time, we make cash investments in companies with technologies that are potentially strategically important to us.

Item 4. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

As required by Rule 13a-15 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), under the supervision and with the participation of our management, including our Chief Executive Officer ("CEO") and our Chief Financial Officer ("CFO"), 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) under the Exchange Act) as of September 30, 2023.

Based on their evaluation as of September 30, 2023, our CEO and CFO have concluded that our disclosure controls and procedures were effective as of the end of the period covered by this report to provide reasonable assurance that the information required to be disclosed by us in our reports filed or submitted under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and is accumulated and communicated to our management, including the CEO and CFO, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting during the fiscal quarter ended September 30, 2023 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitations on Effectiveness of Controls

Our management, including our CEO and CFO, does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all errors and all fraud. Internal control over financial reporting, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of internal control are met. Further, the design of internal control must reflect the fact that there are resource constraints, and the benefits of the control must be considered relative to their costs. While our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of their effectiveness, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within Cadence, have been detected.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

From time to time, we are involved in various disputes and legal proceedings that arise in the ordinary course of business. These include disputes and legal proceedings related to intellectual property, indemnification obligations, mergers and acquisitions, licensing, contracts, customers, products, distribution and other commercial arrangements and employee relations matters. At least quarterly, we review the status of each significant matter and assess its potential financial exposure. If the potential loss from any claim or legal proceeding is considered probable and the amount or the range of loss can be estimated, we accrue a liability for the estimated loss. Legal proceedings are subject to uncertainties, and the outcomes are difficult to predict. Because of such uncertainties, accruals are based on our judgments using the best information available at the time. As additional information becomes available, we reassess the potential liability related to pending claims and legal proceedings and may revise estimates. For additional information regarding pending legal proceedings and associated risks, see the "Risk Factors" sections in our Annual Report and our Q1 Report.

On April 27, 2022, Bell Semiconductor LLC ("Bell Semi"), a patent monetization entity, began filing a series of patent infringement lawsuits against certain technology companies alleging that certain semiconductor devices designed using certain design tools offered by EDA vendors, including Cadence, infringe upon one or more patents held by Bell Semi and Bell Semi seeking monetary damages, attorneys' fees and costs, and a permanent injunction prohibiting the defendants from using allegedly infringing EDA design tools.

On April 29, 2022, Bell Semi also began filing a series of complaints with the U.S. International Trade Commission ("ITC") alleging violations of Section 337 of the Tariff Act of 1930 and seeking limited exclusion orders preventing the respondents from importing into the United States semiconductor devices designed using certain design tools offered by EDA vendors, including Cadence, and cease-and-desist orders prohibiting respondents from importing, selling, offering for sale, marketing, advertising, distributing, or transferring products (except for exportation) made using certain design tools offered by EDA vendors, including Cadence. The ITC instituted three investigations but Bell Semi subsequently terminated one of the investigations. On May 8, 2023, Bell Semi filed motions to voluntarily withdraw the pending ITC investigations.

Cadence was not named as a respondent or defendant in any of the aforementioned actions; however, certain respondents and defendants are Cadence customers and sought defense and indemnity from Cadence regarding Bell Semi's allegations. Cadence offered to defend some of its customers consistent with the terms of the applicable license agreements.

On November 18, 2022, Cadence and another EDA vendor jointly filed an action in the U.S. District Court for the District of Delaware for declaratory judgment of invalidity and non-infringement as to each of the six patents asserted by Bell Semi in the aforementioned actions. Bell Semi's motion to dismiss the declaratory judgment actions was denied on April 27, 2023. On November 28, 2022, Cadence and another EDA vendor also filed a motion for preliminary injunction in the U.S. District Court for the District of Delaware seeking to enjoin Bell Semi from proceeding with its litigation campaign. Motions for preliminary injunction were denied without prejudice on April 27, 2023. Bell Semi responded to the declaratory judgment complaint on May 11, 2023.

On July 25, 2023, Cadence and Bell Semi reached a settlement agreement involving the six patents-in-suit, and on August 1, 2023, Cadence dismissed its action against Bell Semi.

Item 1A. Risk Factors

Our operations and financial results are subject to various risks and uncertainties, including those described in the "Risk Factors" sections in our Annual Report and our Q1 Report, that could adversely affect our business, financial condition, results of operations, cash flows, liquidity, revenue, growth, prospects, demand, reputation, and the trading price of our common stock, and make an investment in us speculative or risky. The "Risk Factors" section in our Annual Report, as updated in our Q1 Report, remains current in all material respects. The risk factors described in our Annual Report and subsequent SEC filings do not include all of the risks that we face, and there may be additional risks or uncertainties that are currently unknown or not believed to be material that occur or become material.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

We are authorized to repurchase shares of our common stock under a publicly announced program that was most recently increased by our Board of Directors on August 2, 2023. Pursuant to this authorization, we may repurchase shares from time to time through open market repurchases, in privately negotiated transactions or by other means, including accelerated share repurchase transactions or other structured repurchase transactions, block trades or pursuant to trading plans intended to comply with Rule 10b5-1 of the Exchange Act. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors.

During the three months ended September 30, 2023, we repurchased approximately 0.5 million shares on the open market, for an aggregate purchase price of $125 million.

In June 2023, we also entered into an accelerated share repurchase ("ASR") agreement with HSBC Bank USA, National Association ("HSBC") to repurchase an aggregate of $200 million of our common stock. The ASR agreement was accounted for as two separate transactions: (1) a repurchase of common stock; and (2) an equity-linked contract on our stock. Under the ASR agreement, we received an initial share delivery of approximately 0.6 million shares, which represented the number of shares at a market price equal to $140 million. An equity-linked contract for $60 million, representing the remaining shares to be delivered by HSBC under the ASR agreement, was recorded to stockholders' equity as of September 30, 2023. In August 2023, the ASR agreement settled and resulted in a delivery to us of approximately 0.3 million additional shares. In total, we repurchased approximately 0.9 million shares under the ASR agreement at an average price per share of $228.26.

As of September 30, 2023, approximately $1.5 billion of the share repurchase authorization remained available to repurchase shares of our common stock.

The following table presents repurchases made under our publicly announced repurchase authorizations and shares surrendered by employees to satisfy income tax withholding obligations during the three months ended September 30, 2023:

Period	Total Number of Shares Purchased (1)	Average Price Paid Per Share (2)	Total Number of Shares Purchased as Part of Publicly Announced Plan or Program (3)	Approximate Dollar Value of Shares that May Yet Be Purchased Under Publicly Announced Plan or Program (1) (In millions)
July 1, 2023 - July 31, 2023	163,423	$ 237.44	155,640	$ 590
August 1, 2023 - August 31, 2023	603,921	$ 223.80	482,370	$ 1,543
September 1, 2023 - September 30, 2023	191,029	$ 237.21	172,622	$ 1,502
Total	958,373	$ 228.80	810,632	

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(1) Shares purchased that were not part of our publicly announced repurchase programs represent shares of restricted stock surrendered by employees to satisfy employee income tax withholding obligations due upon vesting, and do not reduce the dollar value that may yet be purchased under our publicly announced repurchase programs.

(2) The weighted average price paid per share of common stock does not include the cost of commissions.

(3) Our publicly announced share repurchase program was originally announced on February 1, 2017 and most recently increased by an additional $1.0 billion on August 2, 2023.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Insider Trading Arrangements

During the fiscal quarter ended September 30, 2023, our directors and officers (as defined in Rule 16a-1(f) under the Exchange Act) adopted or terminated the contracts, instructions or written plans for the purchase or sale of our securities set forth in the table below.

Name and Position	Action	Adoption/ Termination Date	Type of Trading Arrangement: Rule 10b5-1*	Total Shares of Common Stock to be Sold	Expiration Date
Karna Nisewaner, CVP, General Counsel and Corporate Secretary	Adoption	8/9/2023	X	Up to 7,072	9/30/2024
Anirudh Devgan, President and Chief Executive Officer	Termination(1)	9/13/2023	X	Up to 109,381(2)	5/30/2024
Anirudh Devgan, President and Chief Executive Officer	Adoption(1)	9/13/2023	X	Up to 203,474(3)	12/31/2024
Alberto Sangiovanni-Vincentelli, Director	Adoption	9/13/2023	X	Up to 37,000	12/19/2024

* Contract, instruction or written plan intended to satisfy the affirmative defense conditions of Rule 10b5-1(c) under the Exchange Act.

(1) Represents the modification, as described in Rule 10b5-1(c)(1)(iv) under the Exchange Act, of a Rule 10b5-1 trading plan adopted on June 14, 2023. As a result of this modification, the subject plan is deemed terminated and a new plan is deemed adopted as of the modification date.

(2) Includes up to 109,381 shares subject to Performance Stock Awards previously granted to Dr. Devgan subject to vesting and release to Dr. Devgan during the period from August 25, 2023 to March 15, 2024 upon the satisfaction of the applicable total shareholder return hurdles and relative total shareholder return threshold. The actual number of shares that will vest in connection with these awards is not yet determinable. In addition, the actual number of shares that will be released to Dr. Devgan in connection with these awards and could have been sold under the Rule 10b5-1 trading arrangement would have been net of the number of shares withheld to satisfy tax withholding obligations arising from the vesting of such shares.

(3) Includes up to 100,766 shares subject to Performance Stock Awards previously granted to Dr. Devgan subject to vesting and release to Dr. Devgan during the period from September 15, 2023 to March 15, 2024 upon the satisfaction of the applicable total shareholder return hurdles and relative total shareholder return threshold. The actual number of shares that will vest in connection with these awards is not yet determinable. In addition, the actual number of shares that will be released to Dr. Devgan in connection with these awards and sold under the Rule 10b5-1 trading arrangement will be net of the number of shares withheld to satisfy tax withholding obligations arising from the vesting of such shares and is not yet determinable.

Item 6. Exhibits

Exhibit Number		Exhibit Title	Incorporated by Reference Form	File No.	Exhibit No.	Filing Date	Provided Herewith
10.01	*	Form of Incentive Stock Award Agreement for Non-Executive Employees and Consultants, as currently in effect under the Registrant's Omnibus Equity Incentive Plan.					X
10.02	*	Form of Restricted Stock Unit Agreement for Non-Executive Employees and Consultants, as currently in effect under the Registrant's Omnibus Equity Incentive Plan.					X
31.01	*	Certification of the Registrant's Chief Executive Officer, Anirudh Devgan, pursuant to Rule 13a-14 of the Securities Exchange Act of 1934.					X
31.02	*	Certification of the Registrant's Chief Financial Officer, John M. Wall, pursuant to Rule 13a-14 of the Securities Exchange Act of 1934.					X
32.01	†	Certification of the Registrant's Chief Executive Officer, Anirudh Devgan, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
32.02	†	Certification of the Registrant's Chief Financial Officer, John M. Wall, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
101.INS	*	Inline 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	*	Inline XBRL Taxonomy Extension Schema Document.					X
101.CAL	*	Inline XBRL Taxonomy Extension Calculation Linkbase Document.					X
101.DEF	*	Inline XBRL Definition Linkbase Document.					X
101.LAB	*	Inline XBRL Taxonomy Extension Label Linkbase Document.					X
101.PRE	*	Inline XBRL Taxonomy Extension Presentation Linkbase Document.					X
104		Cover Page Interactive Data File - The cover page from this Quarterly Report on Form 10-Q is formatted in Inline XBRL (included as Exhibit 101).					X

* Filed herewith.
† Furnished herewith.

SIGNATURES

Pursuant to the requirements 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.

CADENCE DESIGN SYSTEMS, INC.
(Registrant)

DATE:	October 23, 2023	By:	/s/ Anirudh Devgan Anirudh Devgan President and Chief Executive Officer
DATE:	October 23, 2023	By:	/s/ John M. Wall John M. Wall Senior Vice President and Chief Financial Officer